

Environmental impacts of aviation business models in the context of Corporate Social Responsibility

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<p>Aviation is a part of the global transportation business, transporting more than 3 billion people in the year 2013. Growth pressure in the field is strong, but environmental factors are coming increasingly important. This combination of rising demand and increasing environmental concern acted as the initial motivation for this study.</p> <p>The aim of the thesis is to study the extent of environmental impacts between the two main civil aviation business models: low cost carriers (LCCs) and full service network carriers (FSNCs). Focus of the study is on the CO₂-emissions of airlines. The correlation between ecological behavior and financial performance is also studied. Information is also used to study the overall situation and future visions of the field. As it is so closely related to environmental aviation, this is, to a large extent, done by studying and comparing fuel efficiencies of different business models.</p> <p>The literature review introduces the reader to the aviation industry, its history, policy makers, economics and airline strategies. Positive and negative impacts of aviation are explained. The industry is studied in the context of corporate social responsibility (CSR) to find the strategies linked to environmental performance of airlines.</p> <p>The study is conducted as a secondary analysis, mostly by studying information published by airlines in their annual- CSR- and sustainability reports. The method of the study is qualitative analysis, which allows the author to focus on the main research questions and to study them in great detail.</p> <p>Results show that low cost carriers are currently much more fuel-efficient, and thus more environmental in their operations. Their financial performance and profit margins are also much better than those of FSNCs. Differences be can partly explained by differences in business models and the CSR focus of airlines. Nearly all airlines are improving their fuel- and CO₂ efficiency, but the best performers of the year 2010 have failed to make further progress. In total, the growth of supply is much faster than efficiency improvements, which leads to bigger total emissions and ecological impact.</p>	
Keywords Aviation industry, Corporate Social Responsibility, Fuel efficiency, Environment, Carbon dioxide	

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1 Introduction

Corporate social responsibility is a subject that has been around for decades, but on today's open and connected world it has become more important than ever. Public knowledge about societal and environmental subjects is growing, and pressure is put on the companies that are harmful to their environment. Many organizations and media rank companies by their environmental and social performance, and news of negative impacts quickly spread around the world in social media.

The same is true in the aviation industry. Climate change is one of the biggest and most threatening problems the world is facing today, and even though aviation only contributes to 2.5 % of global CO₂ emissions, it is a very visible industry and often receives a lot of negative attention from the public. (IPCC 1999, Hough & Kling 2011.) Fuel prices have been rising, and in the last decades the European aviation industry has experienced a dramatic change in its competitive environment as low cost carriers have entered the field. (Eurocontrol 2013.)

Aviation industry is a field consisting of nearly 1,400 airlines and 25,000 planes, transporting more than 3 billion passengers and 50 million tons of cargo on more than 30 million flights every year around the world. (IATA 2014a) Aviation is a wide field ranging all the way from hot air balloons to touristic space flights and military aircrafts, but this thesis focuses on the commercial civil air transport business. This field consists of several business models, but this paper focuses on the 2 biggest business models: Low cost carriers (LCCs) and full service network carriers (FSNCs). Other business models as regional carriers, holiday carriers and cargo carriers are not included in this research.

Corporate social responsibility (CSR) is a term that deals with positive actions of a company towards society and environment, that go beyond the legal limits. By employing efficient CSR, a company integrates and positively influences the society, community, employees and its other stakeholders to its operations. Strategic CSR also includes the aspect of financial performance, as CSR should add value for the company by increasing revenues, degreasing costs or both. (Dahlsrud 2006.)

Corporate Environmental Responsibility (CER) is a part of CSR and shares most of the same characteristics. CER aims to combine business ethics and environmental thinking to create benefits both for the business and the environment. (DesJardins 1998, 825.) As CER is a sub-part of CSR, this thesis will mainly approach the subject from a wider view of corporate social responsibility, and CER is left on lower importance.

The purpose of this thesis is to study the differences of environmental responsibility between full service network carriers and low cost carriers in the context in Corporate Social Responsibility (CSR). This thesis will mainly focus on the use of fuel and efficiency of these airline business models. On the light of this information, the study also aims to make conclusion of the overall environmental impact of the aviation industry as a whole. The study will focus on the following questions:

- What actions and business strategies each business model in using to lower their fuel use, and thus also their CO₂ emissions?
- What are the current environmental climatic impacts of each business model and the industry as a whole, and how are they developing?
- How environmental responsibility influences airline economic performance?
- How companies report their actions and impacts?

2 The airline industry

2.1 Airline business

Aviation is a part of the global transportation context, competing and co-operating with road, rail and ship transportation. They all operate in a business environment shaped by the society, economic situation, regional policy and ecological performance requirements around them. They all aim to maximize their profits in the complicated mix of demand and supply. Aviation stands out from the other forms of transport by its speed. With airplanes, any part of the world is accessible in less than 24 hours. (Ehmer 2014.)

Aviation industry is very challenging industry, as it is a highly competitive business. During the years 1992-2006, aviation was the industry with the lowest average return on invested capital (ROIC) in the US with an average ROIC of 5.9 %, the average of all industries being 14.9 %. The industry is very competitive and volatile to changes, and as described by Porter (2008), the market forces are very strong. These forces are explained more deeply in chapter 3.6.1. Competition between established rivals is fierce, customers are constantly looking for the lowest price and can easily change to a competitor or to a substitutive product such as train or a car. New entrants are constantly entering the field, leading to raising competition and lower prices. Power of suppliers is also high, and they take a large share of the earnings made by the airlines. (Porter 2008.)

2.2 Impacts of aviation

Aviation is an industry closely related to tourism industry, as 52 % of international tourists travel by air. (IATA 2014a) Aviation and tourism can bring huge economic and social benefits to destinations, but they can also have great negative impacts to economy, society and the environment. Airline industry is getting a lot of attention for of its role in the development of tourism and the significant environmental and social impacts on aviation. (Cowper-Smith & Grosbois 2011.)

2.2.1 Positive impacts

As stated earlier, the global aviation system consists of tens of thousands of airplanes transporting yearly more than 3 billion people and nearly 50 million tons of cargo all around the world. Together airlines, airports and air navigation services employ directly 7.6 million people, and the civil aerospace sector employs additional 1.2 million people. With indirect jobs created through the supply chain, catalytic impact on the tourism industry and through the spending of airline industry workers, the global aviation industry supports 58.1 million jobs in total. The total global impact of aviation sector accumulates to \$2.4 trillion per year. (IATA 2014a.)

Aviation connects businesses, countries, people, friends and relatives. It provides a possibility to reach global markets and generates trade and tourism. Through tourism aviation can generate economic, social and environmental benefits on the destinations. Tourism generates direct and indirect jobs and brings money to destinations, and it encourages locals to value and preserve their own culture, ecosystems and nature. It improves living standards and helps fight poverty. (IATA 2014a; The Green Hotels and Responsible Tourism Initiative.)

For example in large, hardly accessible geographical areas such Brazil or Pacific islands, full of impenetrable jungle or vast amounts of ocean, aviation provides the only reasonably fast way of transport between cities. Therefore it can connect population and businesses in a way no other industry could. For many people in such areas aviation is the only way to reach the rest of the world, or even health care. It is also notable that although building an airport will lead to severe local environmental effects, aviation still requires a relatively small amount of physical infrastructure. There is no need to destroy the natural habitats between the origins and destinations as the planes will fly over them. In an area such as a jungle or a mountain range, building a road or a rail track can be a very bad for the local environment, landscape and the climate, and aviation can sometimes be seen as a cleaner option. (ATAG 2014, Norwegian Air Shuttle 2014a.)

Aviation, and especially freight is essential for transporting perishable goods that are highly time-sensitive or have short lifespans. These include things as documents, perishable agricultural and seafood products and pharmaceuticals. Often air cargo may be the only way for producers to distribute their perishable products around the world, and quick distribution of pharmaceuticals and organ transplants has saved thousands of lives only in the U.S. (World Bank 2011a, NBAA 2011.)

2.2.2 Negative impacts

It is clear that aviation has significant positive social and economic effects, but undisputedly it also creates negative impacts on the social and ecological environments. When fuel burns in the engines of an airplane it reacts with oxygen, and one kilogram of jet fuel turns into 3.128 kg of carbon dioxide (CO₂) (Aviation and Climate Change 2014). As stated by NASA (2014), 97 percent of climate scientists agree that greenhouse gas emissions, most importantly CO₂, are impacting the environment and warming the climate. In 2012 the aviation industry generated 689 million tons of CO₂, which accounts for about 2 – 2.5 % of the total global CO₂ emissions. (IPCC 1999, Hough & Kling 2011.) Also, airplanes produce other gasses as nitric oxide (NO), nitrogen dioxide (NO₂), methane and sulfur oxides (SO_x). These gasses are emitted in high altitudes in the upper troposphere, which can make these gasses even more harmful for the climate, temperature and the ozone layer. (IPCC 1999.)

Several other gases than CO₂ are capable to warm the environment. Each greenhouse gas, including carbon dioxide (CO₂), has a warming potential when it enters the atmosphere, meaning that a certain amount can tie up certain amount of heat and warm the climate by a certain amount of degrees. This warming effect of each gas is called CO₂e, or CO₂ equivalent. As different gases have different warming effects, CO₂e shows how much CO₂ should be emitted to create the same warming effect. For example, when 1 kg of methane is emitted, this has the same warming effect than 25 kilograms of CO₂, meaning a CO₂e of 25 kg. (Brander 2012.) For the sake of simplicity and small share of the other gases produced, this thesis focuses on the CO₂ emission of airplanes.

In addition to the harmful gas emissions, airplanes seem to have another warming effect. According to researches, the contrails left on the sky by airplanes have an additional warming effect. (IPCC 1999.) The effect of contrails may be as large as the warming effect of CO₂ emitted by the planes (Handwerk 2006).

Through the tourism it creates, aviation can also be seen responsible for impacts to biodiversity, erosion and physical damage, pollution, resource use and transferring land area for tourism (Forsyth, Graham & Papatheodorou 2010, 241-242). Negative social and cultural impacts include, among others, loss of indigenous identity and values, loss of authenticity, economic inequality, cultural deterioration, crime generation, child labor and prostitution. (UNEP.) Major airports can cause significant problems with aircraft noise and emissions in nearby communities, which can lead to health and stress problems in the population (Forsyth et al. 2010, 243).

2.3 History of airline industry and low cost carrier revolution

Paris Convention (1919) stated that every country had the sovereignty to their own air space. A chain of regulating the aviation industry started after this, which led to an industry of very high regulation. For a long time the aviation industry and the air spaces were heavily regulated by the state. The regulation included, among other things, entry and exit restrictions, price controls, business structure restrictions, route controls, financial controls and cargo regulations. The actions of the airlines were closely monitored. The competition and the choices for consumers were limited, and the air fares could be kept high. Customers were the big losers, and the airline industry could be seen inefficient and lacking the motivation to innovate. Governments could protect their own carriers from outside competition by limiting traffic rights from foreign carriers. The European market was made of nearly 200 bilateral agreements, and the routes were usually flown by countries' national carriers, leaving little chance for competition and causing high prices. (Thierer 1998, Scharpenseel 2001.)

Deregulation started in the US in the end of the 70s, and Europe took its first steps towards deregulation in 1986. New players entered the field and revolutionized the market. Prices fell and more people were flying. In 1993, any airline from the Europe-

an Union was basically free to operate any route freely in the inside the union. In the 90's this increased competition and lowered air fares, but not as dramatically as on the US. Many airlines and airports were privatized, which lead to more economic performance. (Thierer 1998, Scharpenseel 2001.)

Still, change was already on its way. First low cost carriers (LCCs) of Europe were formed in the year 1995, as EasyJet was launched and Ryanair started to use the low cost concept. The sharp rise of LCCs in Europe started after year 2000. As the market share in 2000 was less than 10 %, in 2012 LCCs presented 31 % of the seats.

(Dobruszkes 2013.) In the 10 years until 2012 LCCs enjoyed an average growth of 14 % per year in their number of seats offered, while FSNCs (full service network carriers) only had annual growth of 1 %. LCCs were responsible for 70 % of the additional air traffic from 1995-2012. (Turner 2013.)

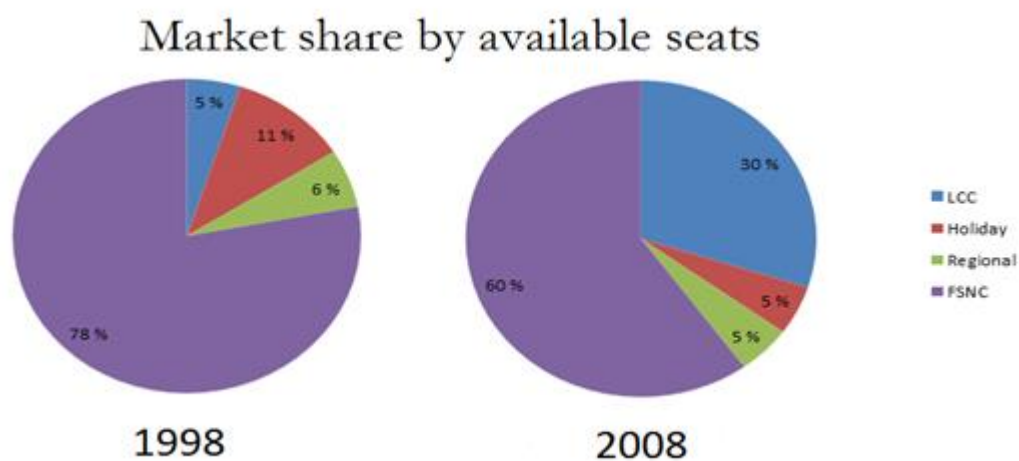


Figure 1. Market share in Europe by available seats in 1998 and 2008 (Reichmuth et al. 2008)

Additional traffic means additional emissions, and largely with the help of low cost carriers, from 1995 to 2009 the number flights in Europe experienced a growth from 6.5 million to nearly 9.5 million flights. This means an average yearly growth of 2.6 %, even in an environment with crises as 9/11 and sharply rising fuel costs (from less than 20 € per barrel to nearly 100 euros per barrel). (Eurocontrol 2013.)

2.4 Regulatory bodies influencing sustainable air traffic development

Even though the aviation industry in Europe has experienced deregulation, it still has to act under several layers of regulation. European aviation has experienced a high level of liberalization, meaning that there is little or no regulation on the prices, entry or exit restrictions or the quantity of flights. The regulation is on the framework, aimed for safety and security measures, environmental aspects and social conditions control. Competition is also controlled to prevent monopoly situations, abuse of dominant position and cartels. (Ehmer 2014.) The situation in the US is very similar with its highly liberal domestic market, but there are many countries around the world where use of air spaces and airports is still regulated, and flight and landing rights are negotiated through bilateral agreements (World Bank 2011b).

Aviation industry still lacks an international protocol on environmental emission limits, as both Kyoto and Copenhagen Conventions on Climate Change failed to set binding international emissions regulations. The aim of these conventions was to agree on binding emissions reductions targets for developed countries. Although the targets for countries were conducted successfully, conventions failed to come to an agreement on the field of aviation. This has caused the aviation policy to vary between regions, bringing negative effects to both environment and business. The participating countries agreed to develop aviation regulations through ICAO (International Civil Aviation Organization). (GreenAir 2009.)

Europe has joined aviation to the emissions trading scheme (EU ETS) to control total aviation emissions. Until the year 2016, only intra-EU flights fall under the EU ETS, but later all flights to/from Europe will have to participate. Emission trading scheme allocates certain amount of emission rights to airlines, and these rights can be sold or bought. To fly more, an airline must either buy more emission rights or develop its fuel efficiency. EU ETS creates a market and a cap for emissions, and is seen as the most efficient method in controlling emissions. In 2013 the total amount of emissions rights is 95 % of average emissions in the years 2004 through 2006. (European Commission 2014a, Trafi 2013.)

The industry is regulated internationally through ICAO, Europe-widely by EASA (European Air Safety Agency), ECAC (European Civil Aviation Conference) and Eurocontrol, and nationally by the national aviation authorities of each European state. The goal of these institutions is to make civil air transport more sustainable, safe and efficient. They create a framework under which an airline must act, and guide the players of the field to act in more sustainable way. IATA (International Air Transport Association) represents the side of the industry, as it is aviation trade organization that represents 84 % of global aviation sector.

2.4.1 ICAO

International Civil Aviation Organization (ICAO) is an organization by UN (United Nations) including 191 countries. ICAO works as a “global forum of States for international civil aviation”, representing its member states. The tasks of ICAO include developing policies and standards, performing studies and analyses, providing assistance and building aviation capacity. From their work and results they develop and standardize regulations, and develop international Standards and Recommended Practices (SARPs). These SARPs are then used by the European and national aviation authorities while designing and modifying the aviation regulations of each state. The vision of ICAO is to “achieve the sustainable growth of the global civil aviation system.” (ICAO 2014a.)

ICAO also has a large role in the sustainable development of aviation industry. The organization has big influence in the future improvements on the sustainability on the whole industry. In its work ICAO is targeting the areas of emissions, noise and local air quality. They are working to find new technologies, operational measures and alternative fuels to fight the pollution, climate change and noise pollution. CAEP (Committee on Aviation Environmental Protection) is a technical committee of ICAO, which specializes in making new environmental policies and SARPs, which will then be distributed through ICAO to all the member states and finally to the airlines. (ICAO 2014b.)

2.4.2 EASA, ECAC and Eurocontrol

European Air Safety Agency (EASA) is an organization of the European Union that is responsible for creating the rules and regulations for safe and ecological civil air transport in the European Union. These rules are passed on to be implemented by European states, and EASA plays a role of monitoring that these standards are being followed. EASA also provides training, expertise and other help to the federal aviation authorities of each European state. (EASA 2014.)

ECAC (European Civil Aviation Conference) is also an European civil aviation organization created in co-operation with ICAO and the Council of Europe. They work to promote “development of a safe, efficient and sustainable European air transport system”. It aims to harmonize the aviation practices and policies in its member states, and to promote the policy matters both on the European countries and world-wide. (ECAC 2008.)

Eurocontrol is the organization responsible for air navigation and air traffic management in European area. They maintain and develop the European airspace in co-operation with their member states. They play an important role for sustainable development, as they work to make the use of the European airspace as efficient as possible. More efficient air space management allows the planes fly more seamlessly and with fewer delays. Because of this the industry can achieve savings in time, money and fuel and therefore also emissions. For example through their program of Singly European Sky (SES) Eurocontrol aims to reduce the average CO₂ emissions by 10 % in the year 2020, compared to the level of 2005. TESA, Eurocontrol’s *Toolset for Environmental Sustainability Assessment* provides tools to assess the environmental effect of new runways, ATC procedures, air-route structures, aircraft types, changes in demand and other issues. TESA also supports researches of different institutions as ICAO and ECAC. As Eurocontrol is creating the future of the air traffic management and use of the European airspace, they have a big role in the future development of the sustainable and safe civil aviation. (Eurocontrol 2014, Eurocontrol 2010.)

2.4.3 National aviation authorities

National aviation authorities are the organizations of each country that are responsible for the aviation happening in their air space and airports. For example in Finland the national aviation authority Trafi is responsible for the safety of all aviation on the Finnish air space. They organize air traffic management and control and control the airworthiness of aircrafts. In addition to safety, Trafi promotes sustainability of aviation, and aims to facilitate and improve the flow of air traffic. Trafi serves the industry and customers in many ways as they issue aviation licenses, supervise license holders, participate in international co-operation, look after passenger rights, provide information and maintain aviation registers. (Trafi 2014.)

2.4.4 IATA

IATA (International Air Transport Association) is the global trade association of world's airlines. IATA represents 240 airlines, which means 84% of total global air traffic. IATA represents the airline industry to increase awareness of aviation's positive impacts and to fight unreasonable rules, charges and regulations. IATA assists airlines to make develop their operations and to bring benefits both for company and customer. It creates clear rules and gives professional support to help airlines to operate safely, securely, efficiently, and economically. IATA aims for environmental development, and has set goals for the industry, in relation to efficiency and emissions. These goals concern nearly the whole industry and are the following (IATA 2014b):

- An average improvement in fuel efficiency of 1.5% per year to 2020
- A cap on net aviation CO₂ emissions from 2020: carbon-neutral growth
- Cut net CO₂ emissions in half by 2050 compared to 2005

2.5 Airline economics

Aviation is an industry that is very vulnerable for changes in economic situation, business cycles and costs of resources. Fuel prices are very unstable and hard to forecast. Airline profitability correlates strongly with the economic situations, and growth of GDP (gross domestic product) leads to high rise of passenger numbers. Similarly, re-

cessions and slow growths of economy quickly reflect negatively to airline economic performance. These tough times in economy reflect even harder to high-yield business traffic. Yield means the average amount paid by passengers, and customers with higher willingness to pay will raise the yields. After the latest downturn after 2008, the number of these premium passengers fell considerably, and has not recovered at the same rate as economy passengers. This has put FSNCs in more disadvantageous situation. (Ehmer 2014, Vogel 2014.)

Airline yields have been dropping continuously for decades as competition and deregulation have grown, and yield- and revenue management has become one of the core operations of any airline. These actions aim to fill the plane to its maximum capacity with maximum price for each seat. This is very important as an airplane seat is a highly perishable product, which means that an empty seat on the air cannot be stored for later and means immediate loss for the airline. Tough competition and regular recessions have also forced many airlines to co-operate to survive. Alliances are now more popular than ever and airlines are merging with each other. (Ehmer 2014, O'Connor 2001, 3-9.)

2.6 Traditional carriers vs. low-cost carriers

In just under 20 years low cost carriers have appeared out of nowhere, and now account for more than 30% of European civil aviation. (Dobruszkes 2013.) Even though FSNCs and LCCs often compete on the same geographical area and on similar equipment, they have substantial differences in their business strategies.

2.6.1 Full Service Network Carriers

Full service network carriers, (FSNC) or full service carriers, are airlines that provide wide range of different services both before and during the flight. They invest in high quality with different service classes for different target groups. Besides the flight, they offer additional services as meals and lounges, they tend to include luggage in ticket price and offer connecting flights. They have geographically wide network, as they operate many kind of flights from regional to intercontinental flights. Therefore their fleet is varied, containing airplanes from small regional aircrafts to wide-body aircraft.

FSNCs are often current or former national carriers, although many of them have been privatized. (Reichmuth et al. 2008, Wulf, Meissner, Brands & Maul 2010.)

FSNCs tend to operate a hub-and-spoke model, and this is one key factor of their business model. This means that the airline operates their traffic through one or more hub-airports. As they operate in this centralized way, they are able to offer many more destinations for their customers. By changing aircraft at the hub, a passenger can connect from one origin to a great number of destinations. Also, this allows carriers to direct more passengers on their long-haul flights that leave from the hub. This also brings many economic benefits for the airline. They benefit from **economies of density**, as many origins and destinations can lead to higher load factors, and thus to lower unit costs. **Economies of scale** can be achieved if higher demand and higher passenger numbers justify the use of larger aircrafts. This leads to lower unit costs per seat. By using hub-and-spoke model the airlines can also benefit from **economies of scope**, as this allows centralized provision of maintenance, staff and backup aircraft. (Reichmuth et al. 2008, Vogel 2014.)

2.6.2 Low Cost Carriers

Low cost carriers, sometimes described as no-frills airlines, are airlines that place low prices in the center of their competitive strategies. As Dobruszkes (2013) states, there is no single way to describe the LCC business model, as there are many different levels of low cost. In Europe low cost airlines serve most importantly large cities and areas of high tourist interest. They compete with traditional carriers but also operate many niche-routes. They don't usually operate hub-and-spoke model, but focus on profitable point-to-point routes. LCCs aim to keep their cost structures low, and therefore they are able to offer substantially lower prices than full service carriers. (Dobruszkes 2013.)

Low cost carriers report several ways to keep their expenses low. These include cost-cutting strategies in the fields of fuel, staff, maintenance, airport costs, air traffic control costs, in-flight service, capital and leasing, marketing and sales. (Reichmuth et al. 2008.) Traditionally, these actions include, among others, aspects as the following (AirAsia 2014a, Sabre 2010, Reichmuth et al. 2008):

- No luggage included in ticket price – additional revenue from sales of luggage
- No food/drinks included – additional revenue from sales onboard
- High aircraft utilization
- Single type of aircraft
- Short turnaround times – high daily usage of aircraft
- No refunds
- Single class seating
- Lean distribution system (online booking, avoiding travel agents)
- Only online-check in
- Lower staff costs
- Effective revenue management
- Merchandising

As fuel is a huge expense for any airline, fuel-saving actions are very popular in LCCs. For example Ryanair is aiming to reduce fuel use by 30 %, and many airlines as AirAsia base fuel-saving actions in their financial and environmental strategy. Some of these actions can also save money in other ways, as lower landing costs in secondary airports. The actions taken by airlines to reduce fuel use include, among others, the following (Reichmuth et al. 2008, AirAsia 2014a, AirAsia 2013, Ryanair 2014, Sabre 2010):

- Using new, fuel-efficient aircraft
- Secondary airports (faster turn-around times, less time in holding pattern and less taxiing, lower landing & maintenance costs)
- Point-to-point service (no hubs, customers fly shortest route possible)
- Aircraft interior weight reductions
- Improving navigational systems & more efficient landing procedures
- Use of winglets / sharklets (lower fuel use)

As Hough & Kling (2011) state, operational efficiency of any airline is crucial for their ecological impact and profitability. For example, between years 2000 and 2011 US carriers saved 33 billion USD and more than 300 billion kg of CO₂e emissions, only by improving their operational efficiency. The formula for efficient operations consists of

5 aspects: 1) aircraft model, 2) seating density, 3) load factor, 4) freight share and 5) distance flown. Especially low cost airlines take these factors into consideration, as they tend to fly new, fuel efficient aircrafts, pack a lot of seats in each plane, use efficient revenue management to keep their planes full and avoid flying freight. By using these methods they can achieve lower average fuel use and lower emissions. Short-haul flights are bad for operational efficiency as take-offs and ascents burn lot of fuel, thus resulting in higher average fuel use. (Hough & Kling 2011.) Still, short flights are popular with LCCs as the net fuel consumption is smaller and they can offer lower, more attractive prices.

It is important to note that LCCs do not only “steal” passengers from full service airlines. With their low prices and point-to-point services to previously unserved routes they generate significant amounts of new air traffic. 60 percent of all LCC customers are passengers who would not have used air transport if there was no LCC carrier, and only 40 % is traffic “stolen” from traditional carriers. 70 % of the new passengers would not have travelled before at all, and 30 % would have travelled by a different mean. Additional traffic means additional emissions, and if the operational efficiency is not growing at the same rate, the total net emissions will be rising, leading to more pressure on the environment. (Vogel 2014.)

	Low cost carriers	Full Service Network Carriers
Service levels	Typically 1	Typically 2-4
On-board service	On extra charge	Included in ticket price
Fleet type	Single aircraft type	Several aircraft types from regional to wide-body
Seat density	Very high	Differentiating between service classes
Route structure	Point - to - point	Hub & spoke model
Leg lengths	Short, typically < 2 hours	From regional to ultra-long haul (> 12 hours)
Airports used	Secondary	Primary
Turn-around times	Typically 20-30 minutes	Typically 40-50 minutes
Wright	Does not carry wright	Transports cargo using aircraft belly capacity
Staff	Young, cheap, non-unionized	Long company histories, high wages, strong unions
Management	Lean, relatively small	Wide, expensive
Distrubution	Direct, online sales	Travel agencies
Marketing	Fresh and innovative methods	Traditional and powerful

Figure 2. Main traditional characteristics of business models (Boeing 2014, Reichmuth et al. 2008, Vogel 2014)

The figure above describes the main characteristics of low cost carriers and full service network carriers. Differences can be found in all aspects from customer service to route planning and management of the company.

2.6.3 Development of business models

Lately, the concepts of FSNCs and LCCs have been somewhat questioned as the business models have started to move closer to each other. Some low cost carriers have been differentiating their product by offering higher levels of service, and currently there are many different levels of low cost. This has been done to differentiate their product from competitors and to lure in higher-yield customers. At the same time, many FSNCs have adopted practices from LCCs, bringing their business model closer to low cost model. These airlines that are in the middle and are hard to classify to either business model are often called “hybrid carriers” (Wulf et al. 2010, Fageda, Suau-Sánchez, Mason 2014.) Therefore many airlines cannot be characterized strictly to either business model, but many companies could be seen more as on a line going from low cost to full service, with companies having their place on the line.

2.6.4 Economic situation of business models

The figure below shows revenues, operating profits and net profits of a group of selected European airlines in year 2012.

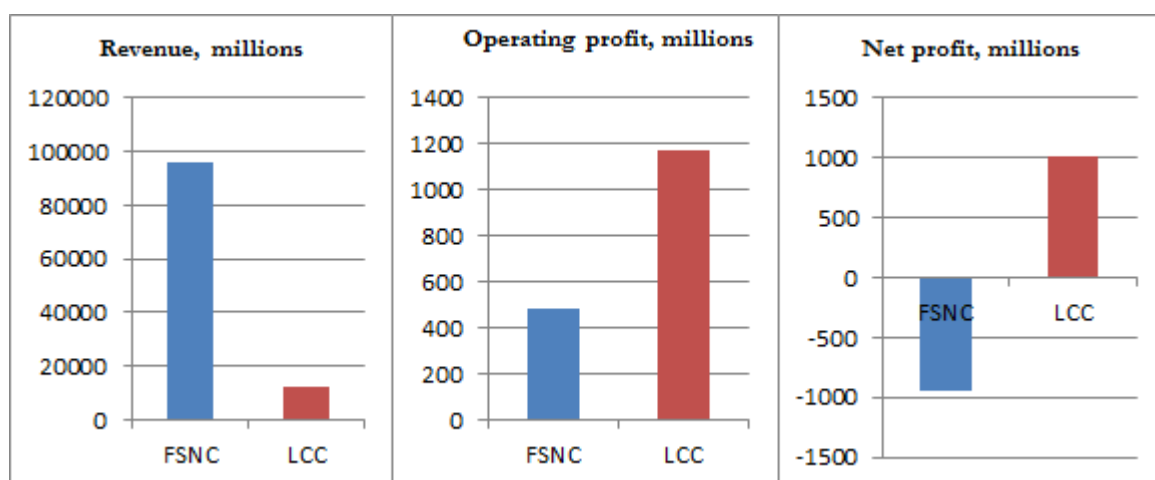


Figure 3. Comparison of revenues, operating profits and net profits of selected European airlines in the year 2012 (Vogel 2014)

Although FSNCs are creating considerably more revenue than low cost carriers, but they are struggling to make profit in the challenging business environment. Regardless of their much lower prices and total revenues, LCCs have managed to make substantial profits and defeat their full service rivals. This means that the profit margins of LCCs are much higher than those of FSNCs. This can be clearly seen in figure 3. (Vogel 2014.) Operating profit means profit made in the core operations of a company, excluding things as interest and taxes. Net profit tells the real amount of money in hand at the end of the year, after all additional costs, taxes and exceptional items. (Investopedia 2003a & 2003b.)

3 Corporate social responsibility

A company is a player of the market that creates and sells goods and services to society for profit. This is the foundation of company's operations and of the capitalistic system. The society expects the company to provide its products in a legal manner, complying with the rules, laws and regulations set by the government. A company that cannot live economically sustainably will fall off the market, and a company that does not obey the laws will be put in responsibility. These are the legal boundaries of company's actions. If a company obeys these rules, it can function freely and lawfully. (Matten, Pohl, Tolhurst & Visser 2010, 112-113.)

Still, many companies extend their actions for community further than legally needed. They follow ethical norms and responsibilities by making decisions, actions and practices that are beyond what is required by the law. A business may take a social role in the community and voluntarily put resources to do good for the society and the environment. These good deeds can include, among others, philanthropy, charity, supporting local communities, voluntary actions by employees and supporting non-profit organizations. These voluntary actions that are aimed to the well-being of community and environment are the bases of Corporate Social Responsibility (CSR). (Matten et al. 2010, 112-113.)

3.1 What is corporate social responsibility?

The concept of CSR has been around for 50 years, and in the last decades it has seen a big rise in popularity. CSR is being researched and used around the world, and CSR tools, strategies and practices are being developed. Corporate social responsibility is a well-known tool and can be seen as one of the key elements of modern-day management in companies, organizations and even in the government level. (Matten et al. 2010, 15-16.) Still there has been a lot of controversy about the definition of the term and about what aspects CSR includes. As there is no single definition, people might have different approaches to CSR and this can cause controversy and confusion while discussing about the subject. (Dahlsrud 2006.) Some of the many definitions of CSR include the following:

"Corporate Social Responsibility is the continuing commitment by business to contribute to economic development while improving the quality of life of the workforce and their families as well as of the community and society at large." (The World Business Council for Sustainable Development 2000.)

Corporate Social Responsibility (CSR) is the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve quality of life, in ways that are both good for business and good for development (Petkoski & Twose 2003).

"CSR is about how companies manage the business processes to produce an overall positive impact on society." (Baker 2004.)

"The responsibility of enterprises for their impacts on society." (European Commission 2011.)

(Corporate Social Responsibility) "encompasses the economic, legal, ethical, and discretionary or philanthropic expectations that society has of organizations at a given point in time." (Matten et al. 2010.)

Even though there is no universal definition available, the similarities and different approaches to CSR can be investigated. In his study Dahlsrud (2006) investigated 37 different definitions of CSR and counted the most frequently mentioned aspects.

These five dimensions include the following:

- The stakeholder dimension
- The social dimension
- The economic dimension
- The environmental dimension
- The voluntariness dimension

Together these definitions describe Corporate Social Responsibility as actions that contribute positively to a cleaner and healthier environment. CSR integrates and positively influences the society, community, employees and other stakeholders. The actions are voluntary, and not driven by laws or regulations. It is also seen important that the actions contribute positively to the economic situation and business operations of the company. The investments should also be financially profitable for the company. (Dahlsrud 2006.)

These aspects are also described in the popular term of “triple bottom line”. It is also known as the 3P formulation, as it consists of 3 Ps: planet, people and profit. As company’s bottom line is usually seen as the revenues (profit) made by the company, the 3P formula adds 2 more bottom lines. These measure the performance and effects of the company to the environment (planet), and to the society that is influenced by the actions of the company (people). For all the actions of a company there is an environmental and a societal price. Through triple bottom line companies can truly see the impact they leave, and by measuring and seeing the results they are likely pay more attention on the subject. (The Economist 2009; Elkington 2004.)

A traditional way to describe CSR in one picture can be seen in the pyramid of CSR, as described by Carroll (1991), and as seen below on figure 4.

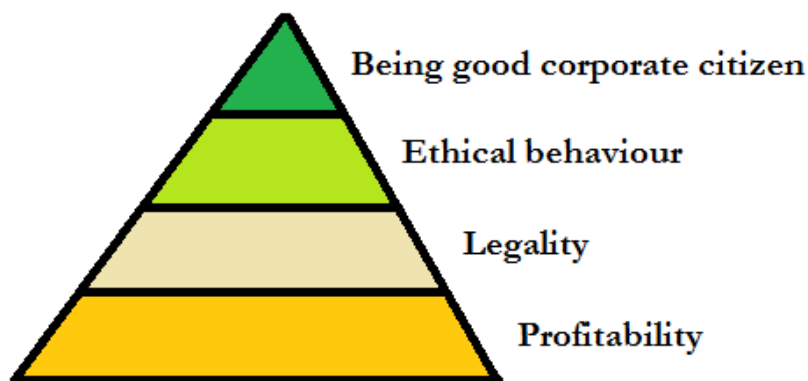


Figure 4. Pyramid of corporate social responsibility (Carroll 1991)

The pyramid shows how economic performance is the base of operations, and deals with commitment to stay profitable, keeping strong position and maintaining good operational efficiency. Other actions are built on top of that foundation. On the second level is legality of actions, meaning that company must act in a legal manner, complying with the laws around them. The third level is ethical behavior, which means acting in a non-harmful way and that the environment is not exploited in operations. These are already actions that are beyond what required by law. The highest level is being good corporate citizen, or the philanthropic level. On this level a company acts in the benefit of the society around them and contributes their resources to do good for their surroundings. (Carroll 1991.)

3.2 Different approaches to CSR

Traditionally, the U.S. model of performing CSR has been based on the **philanthropic model**. This means making business in a traditional method, and then distributing parts of the profits to good causes. Companies give money to charities, to community or to other charitable causes. (Baker 2004.) The philanthropic model is problematic because of its objective, as it often fails to contribute to the development of the business and its functions. Philanthropic actions are often only a set of uncoordinated activities without a link to the strategy of the company. They fail to have a long-term impact to either company's competitiveness or to the society. (Porter & Kramer 2006.) The nature of philanthropic actions is summed up by Porter and Kramer (2002):

“Most consist of numerous small cash donations given to aid local civic causes or provide general operating support to universities and national charities in the hope of generating goodwill among employees, customers, and the local community. Rather than being tied to well-thought-out social or business objectives, the contributions often reflect the personal beliefs and values of executives or employees.”

In the European **core business model** the business itself is built on socially responsible base, and the investments are made to targets that have connections to the core business. This way CSR actions can become a part of core operations and the business

itself can be built in a responsible way. CSR actually becomes a way of making business, creating wealth and achieving competitive advantage. (Baker 2004.) This way of thinking is the base for the modern strategic CSR, as by described by Porter and Kramer (2002, 2006 & 2011).

As Matten et al. (2010, 114-115) say, to make CSR tempting for executives, they must be able to see the benefits associated with the subject. They describe levels how managers can use CSR to benefit their businesses. These include the following:

- **Defensive approach** is a cost-cutting approach where a company reduces costs by putting CSR efforts only on aspects of business that are costly
- **Cost-benefit approach** is a traditional model where a company performs CSR activities that have a bigger benefit than cost
- In a **strategic approach** CSR is engaged as a part of the corporate strategy
- In **innovation and learning approach** active engagement to CSR enables a company to understand the market better, support learning and innovation and get competitive advantage

3.3 Environmental aspect

As stated in the introduction chapter, environmental responsibility is very closely related with CSR actions, described as one part of the CSR concept. Therefore concepts of environmental responsibility are very similar with CSR. As Kumar & Sindhi (2012) say, environmental aspect of CSR and good environmental performance have increased their importance in the strategies of companies, as public knowledge of the subject and costs involved have increased. This environmental responsibility is called Corporate Environmental Responsibility (CER). (Kumar & Sindhi 2012.)

Powers of business are strong, and they can have substantial effects on environmental and ecological levels. Global ecological problems are traced back to the companies causing them, and especially the ones not taking responsibility of their actions. (Dum-

mett 2006, 375.) As stated in the chapter 2.2.2, this is also the case in the airline industry, as aviation has big effect on local ecosystems and global atmosphere. Well-working environmental management combines the business ethics and environmental thinking, with an aim to build a synergy that can be profitable and sustainable both for business and the environment. (DesJardins 1998, 825-829.)

3.4 Importance for companies

The actions of companies are increasingly monitored by media, government and activists. Companies are held responsible for the consequences of their actions, and their environmental performance is being ranked by many organizations. Actions of company, especially the ones with highly negative social or environmental effects, can attract lots of publicity and be devastating for business. Some companies have only noticed the importance of CSR actions after negative public responses to their actions. For these reason corporate social responsibility has become a vital tool in businesses all around the world. (Kramer & Porter 2006.) European Commission (2014b), states that corporate social responsibility is an increasingly important aspect of competitiveness, as it can “bring benefits in terms of risk management, cost savings, access to capital, customer relationships, human resource management, and innovation capacity”.

There are several external drivers that influence the motivation of companies to invest in environmental responsibility. These aspects can force or motivate executives to employ more environmental procedures by putting pressure on the company or by creating rules and laws to follow. These aspects include the following (Dummett 2006, 377):

- International agreements
- Government policies
- Market forces
- Community groups
- Non-governmental organizations (NGOs)

These are the external motivations for environmental actions, but companies also have their own, more internal reasons to employ CSR and environmental responsibility.

PricewaterhouseCoopers (2002, in Matten et al. 2010, 114-115) and The Aspen Institute (2002, in Matten et al. 2010, 114-115) collected reasons why executives use CSR in their business operations. These include, among others, the following elements:

- improvement of company reputation
- demand from the customers and stakeholders
- cutting costs
- achieving growth in a sustainable way
- customer loyalty
- productive and satisfied staff
- lack of legal problems
- stronger and healthier community
- getting competitive advantage
- increased revenues

In conclusion, “CSR not only benefits society and stakeholders, but it provides specific, business-related benefits for business as well.” (Matten et al. 2010, 115.)

3.4.1 Importance for aviation industry

Deregulating markets, privatizing public services and a liberalizing global economy have caused companies to become the center of public concern throughout the field of business (Matten et al. 2010, 15-16). Similarly, growing public attention forces airlines to pay more attention to their actions. As in other businesses, motivation and importance of more environmental performance in airlines comes both from external and internal sources. External aspects create boundaries under which airlines must operate, or create business situations to which airlines can react by improving their environmental management. These aspects include the following (Lynes & Dredge 2010, 119-126.):

- National and international policies
- Growing local regulations, for example airport noise- or emission limitations

- Market changes, cycles and competition
- Crisis like 9/11
- Pressure from NGOs and environmental organizations

Internal reasons include such goals as achieving competitive advantage or administrative reasons. Investments in environmental improvements can lead to both direct savings and indirect additional income. Improved fuel-efficiency will lead to reduced fuel costs, avoidance of emission-related charges and to better image. “Greener” image will lure more customers to the company. (Lynes & Dredge 2010.)

In their case study of Scandinavian Airlines Lynes & Dredge (2010) described company’s 5 most important drivers of ecological responsibility, which included both internal and external reason. These five motivations include 1) financial cost-benefit of environmental management, 2) regulatory framework, 3) desire to be a “good corporate citizen”, 4) airline image, and 5) relationships with the aviation community.

3.5 Use of CSR in the aviation industry

Cowper-Smith and Grosbois (2011) studied the CSR-related actions in the field of aviation. Their study focused on FSNCs, and it revealed that even though airlines were taking several actions concerning health, safety and wellbeing of employees and society, the main effort was put on the environmental aspect. The main aspect was the reduction of CO₂ emission, and as stated by Cowper-Smith & Grosbois (2011), that “is the area in which the airlines are challenged most often”. All of the companies who released a sustainability report named the reduction of CO₂ emissions as an aspect of their CSR actions. The methods to do this consist of the following:

- Introduction of new fuel-efficient aircrafts
- Latest technology engines
- Optimization of operational procedures
- Aircraft weight reduction measures
- Engine washing
- Conducting/supporting testing of alternative fuels

- Installation of winglets
- Partnerships with NGOs
- Partnership with rail companies
- Carbon-offsetting program
- Environmentally friendly ground vehicles / operations
- Sponsorship of scientific research projects related to CO2 emissions

Nearly all companies were reporting waste reductions, for example through recycling and paperless ticketing. Such environmentally relevant aspects included the following:

- Controlling energy consumption / using green energy
- Controlling the use of water
- Programs to ensure ecological integrity
- Involved in environmental conservation projects
- Reducing aircraft noise.
- Participation in scientific research projects (non-emissions-related)
- Sponsoring environmental companies.
- ISO 14001 certification for environmental management systems.

(Cowper-Smith & Grosbois 2011.)

CSR actions of low cost carriers seem to be harder to find. As stated by Coles, Dinan & Fenclova (2010), most of Low Cost Carriers do practice CSR in their operations, but often it is not visible for an outside observer. Still, the actions taken tend to be only “elementary”, and the airlines “do not have a formal policy, strategy or detailed implementation plan to guide their CSR practices.” With the lack of precise strategy these actions more scattered, uncoordinated and unbalanced. They focus on defensive CSR approach to protect the image and the reputation of the airline. The results are measured in savings rather than in additional income. Regardless of these aspects, LCCs tend to perform in a way that is relatively environmentally friendly, as their business strategies are built on a lean, fuel-saving platform. (Coles et al. 2010.)

3.6 CSR as strategy

3.6.1 Strategy

A strategy is a plan of a company on how to outperform rivals by establishing a difference that it can preserve. As Porter and Kramer (2006) state, strategy “is about choosing a unique position—doing things differently from competitors in a way that lowers costs or better serves a particular set of customer needs.” Watkins (2007) defines business strategy as “set of guiding principles that, when communicated and adopted in the organization, generates a desired pattern of decision making.” Strategy is the way how a company will achieve its mission and goals, and a plan how resources will be allocated to best reach these goals and to create a unique market positioning that allows company to achieve competitive advantage. The key factor is to achieve a unique position in a way that the company can preserve and benefit in a long run. (Porter & Kramer 2002 & 2006, Watkins 2007.)

Porter (2008), updating his article from year 1979, describes the five competitive forces that shape corporate strategy. These forces describe the nature of the market and describe the environment that should shape the strategy of a company. These competitive forces can be seen in the figure below.

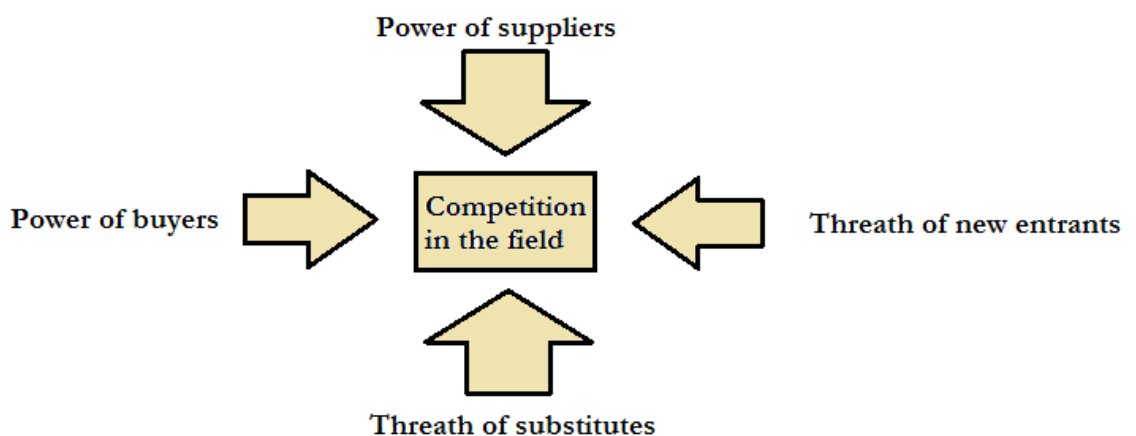


Figure 5. Five competitive forces shaping corporate strategy as described by Porter (2008)

The power of existing competitors, customers and suppliers can influence the costs and revenues of any company. Potential new entrants with new capacity and fresh ideas can gain a big market share. Substitute products can lure customers away. A functioning strategy is a plan how to function with these forces, how to position the company where the forces are smallest, studying and exploiting changes in these forces and reshaping these forces in the favor of the company. As stated earlier in this work, aviation is an industry where all these forces are strong, and therefore it is a very challenging industry with high competition and low return of investment. (Porter 2008.)

3.6.2 CSR as a strategy

The problem of traditional CSR actions is that often they are only done to improve the public image and showcase the achievements in company's annual report. Corporations do CSR to keep people happy, to fulfill the moral expectations of the community and to manage the reactions of pressure groups. These actions may lead to increased customer loyalty and cost savings, but still they are only tools and usually short-term solutions. They fail to benefit the company and the society in long run, as the actions are only uncoordinated actions that are not connected to the strategy. To take full advantage of the possibilities of CSR, it must be integrated as part of the strategy and core business actions. (Porter & Kramer 2006.)

To be successful, companies need healthy society around them. Healthy society creates more demand for products. If a company exploits the society and environment to pursue its own interest, its success will be temporary at best. Also, a healthy society needs healthy companies. The relation between corporations and society is the fundament of strategic CSR. To perform successfully in a long run, both parties must benefit of cooperation. A company should find social problems that intersect with its business and have a connection to the work of the company. This way the CSR actions can be linked with the society. (Porter & Kramer 2006, Zadek 2004.)

At best case the CSR efforts cause such benefits to community that those benefits end up benefiting the company itself. For example, providing education to uneducated youth will lead to efficient work force and to better living conditions for the society.

Investing to improve a poor traffic infrastructure will lead to more car buyers and benefit the society by providing better transportation and connectivity. Designing less polluting cars such as hybrid cars the manufacturer can get a substantial competitive advantage, while emissions are cut down by up to 50 %. Food companies working in 3rd world countries can co-operate with local farmers to develop more efficient methods of farming. This leads to higher living standards in local the communities and higher revenues for the company. (Porter & Kramer 2006.)

In the aviation industry, the findings of environmental and CSR-related strategies are diverse, but not very visible. Information is hard to find, as many studies have not been done about the subject. Full service network carriers tend to be more involved with placing environmental and CSR-related themes as part of their core strategies. With these strategies they aim for better image, better industry relations and cost-savings. (Cowper-Smith & Grosbois 2011, Lynes & Dredge 2010.) Low cost carriers tend to lack a precise strategy, and their actions are more scattered or focused on defensive CSR to protect reputation. (Coles et al. 2010.)

All across the aviation field, the studies fail to show proof of any deep strategic commitment to corporate social responsibility actions, such as can be seen on the examples on chapter 3.6.2. The studies tend to present CSR efforts more as a bunch of actions, instead of comprehensive strategies.

3.7 Measuring and reporting CSR actions

As there has no standardized world-wide method of measuring and reporting CSR actions, companies communicate their CSR actions rather inconsistently. Transparency and accountability is seen as an increasingly important factor in private and public enterprises. Efficient and standardized measuring and reporting is important to measure the progress a company makes in their actions and, even more importantly, what is the economic value of those actions for the business. If measuring is not efficient, companies will not see the full consequences of their actions and will miss important opportunities to innovate and grow. Reporting these findings in a standardized way is important to provide transparency and to allow comparison between companies. Current-

ly the situation is getting better, and nowadays many countries require companies to report their effects to environment and society, and some stock exchanges demand sustainability reporting as a listing requirement. (Nielsen & Thomsen 2007, 25-26, Porter, Hills, Pfitzer, Patscheke & Hawkins 2011, Ghuliani 2013.)

Companies communicate their CSR efforts and results either as a part of their annual reports, or in separate CSR reports, sustainability reports, environmental reports or social reports. The way of communicating still varies from company to company, but more and more companies are adopting the Global Reporting Initiative (GRI). GRI aims to create sustainability reporting standards for companies and organizations by creating metrics and methods to measure performance in environmental and social dimensions. Still, even the motivation for using GRI varies between companies. Some companies use GRI mainly as a source for inspiration, while other companies use it as the best reporting tool available. (Nielsen & Thomsen 2007, 29-30, GRI 2014.) The aim of GRI can be seen in the statement of its vision:

“The Global Reporting Initiative’s (GRI) vision is that disclosure on economic, environmental, and social performance becomes as commonplace and comparable as financial reporting, and as important to organizational success” (GRI 2010).

The evidence shows that traditionally the level of CSR reporting has been low in the aviation industry, as only 34 % of airlines in the 3 biggest alliances published CSR reports in the beginning of year 2009. Most of these airlines do this by publishing a separate CSR- or sustainability report, and the use of GRI metrics has been growing in the recent history. (Cowper-Smith & Grosbois 2011.) Heeres, Kruijd, Montgomery and Simmons (2011), found 15 % increase of CSR reporting from the year 2009 to 2010 in their study of the leading airlines. This shows that the situation is getting better. They stated that CSR reporting is finding its way to aviation industry, and it is starting from the biggest companies. Vast majority of these CSR reports were full CSR reports, with some integrated and environmental reports also being published. (Heeres et al. 2011.) LCCs seem to be less invested in CSR reporting, and their CSR-related actions are of-

ten not visible to an outside observers. Even though they might invest in sustainability, the actions are not being reported to the public. (Coles et al. 2010.)

3.8 The future – From CSR to CSV?

Even with huge amounts of studies and information, many companies are still struggling with corporate social responsibility and the ways how to use it. The concept is developing, and the modern view of CSR is shifting from a set of philanthropic actions to including CSR actions as a part of the core business. Porter & Kramer (2011) popularized the term *Creating Shared Value (CSV)*, which takes different aim to the subject of responsible business management. When CSR actions have traditionally been viewed as means to relocate wealth to do good deeds, CSV itself is a strategy used by the company and aims to maximization of profits.

CSV does not see corporations and society as opposite parties, but as parts that should work together, reinforcing and creating value for each other. Companies are not acting as charitable donors, but as businesses doing business, allowing maximum value creation for both company and society. CSV is not about reinvesting value created by the company, but about expanding value creation for all parties. For example, while fair trade (reinvesting value) may increase income of local farmers by 10-20 %, investing in better farming methods (CSV approach) can raise income by 300 %. This leads to better living conditions for locals and creates wealth for the company. Porter and Kramer describe shared value as a way to reinvent capitalism, while doing much greater good than CSR programs as philanthropy, fair trade, food programs and other such actions could ever do. (Porter & Kramer 2011.)

4 Research

This chapter familiarizes the reader with the research approach, methods and process. As stated earlier, the purpose of this thesis was to study the differences of environmental responsibility actions and strategies between full service network airlines and low cost carriers in the context in Corporate Social Responsibility (CSR). This study aimed to find out what CSR-related actions airlines were taking to cut their CO2 footprints, and in what extent they included these actions on their strategies.

4.1 Research methods

The research was concluded completely as a secondary analysis, investigating annual reports, sustainability reports and websites of the companies selected. As described by Glass (1976), secondary research is a method that can be used to study old, existing data to answer new research questions. The data analysis was mainly concluded in a qualitative analysis. While quantitative methods are more focused on statistical analysis with big target groups, a qualitative method approach focuses more on open-ended questions, observation and document data and in-depth analysis of the data. Although the study also includes statistical data and numbers, the data was selected from carefully selected companies. As the qualitative method allowed focusing on a small amount companies, these companies could be studied in high detail. (Creswell 2014, 4-14.) As Creswell (2014) states, qualitative research process “involves emerging questions and procedures, data typically collected at participant’s setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data.” Qualitative research was also most convenient research method, as the data that is available about the subject is quite limited and not many studies have been done about the subject in the past.

4.2 Selection of companies

The companies studied in the research were selected to provide a comprehensive sample of the field in several geographical areas in Europe, Asia and America. 5 airlines were selected from both airline business models, focusing in major airlines to study the actions of the industry leaders. Low cost airlines were chosen to represent deeper

commitment to low cost, and avoiding so-called “hybrid carriers” which have developed to be much closer to the full service model. This was done to find the true nature of low cost strategy. The airlines selected were the following:

- FSNCs: Finnair, Delta Airlines, Malaysian Airlines, TAP, British Airways.
- LCCs: Norwegian Air Shuttle, Southwest Airlines, AirAsia, Ryanair, EasyJet.

The airlines were chosen as counterparts for another airline, so that the airlines operate on the same area and compete of the same consumers. These include:

- AirAsia and Malaysian Airlines (competing in south-eastern Asia)
- Delta Airlines and Southwest Airlines (competing in northern America)
- Finnair and Norwegian Air Shuttle (competing in European routes from Finland)
- EasyJet and British Airways (competing from Great Britain)
- TAP and Ryanair (Ryanair has entered Portuguese market and now operates from 3 airports to dozens of destinations around Europe)

4.3 Data collection

Data was collected completely with the methods of secondary analysis, by investigating data published by the airlines. This was the most convenient and basically the only reasonable way to conduct such a global and comprehensive study, as conduction of interviews or questionnaires from all companies would have been very challenging. Also, the data released from airlines was recent and comprehensive. As the data is focused to airline’s shareholders and other stakeholders, it can be expected to be reliable and relevant. The study focused on the latest communal relations reports which included annual reports, sustainability reports and CSR reports. Some information was also gathered directly from the websites of the airlines.

Reporting method	Count	Reports used
CSR / sustainability report	4	Delta Airlines (2014a), British Airways (2014a), TAP (2014a), Malaysian Airlines (2013)
Annual report based on GRI guidelines	1	Finnair (2014a)
CSR / Sustainability section in annual report	4	Norwegian Air Shuttle (2014a), Southwest Airlines (2014), AirAsia (2014b), EasyJet (2014a)
No report on CSR / sustainability actions	1	Ryanair (2014 a)
Separate annual report	5	Delta Airlines (2013 & 2014b), British Airways (2014b), TAP (2014b), Malaysian Airlines (2014), Ryanair (2014)
Additional website information used	3	Ryanair (2014b), AirAsia (2014a), EasyJet (2014b), Finnair (2014b & 2014c), Delta (2014c), Norwegian Air Shuttle (2014b), British Airways (2014c)

Figure 6: Overview of the reports used for the study of current situation

Data for the figures of year 2010 was collected from the following annual releases: British Airways (2011), Delta Airlines (2011), TAP (2011), Malaysian Airlines (2011), Finnair (2011a & 2011b), Norwegian Air Shuttle (2011), Southwest Airlines (2011), AirAsia (2011), EasyJet (2011) and Ryanair (2011).

Data was collected in 3 different ways: numerical data was entered to an Excel-table and written data was entered to a Word sheet. Also, all environmental actions of each airline were collected to an Excel sheet to compare the efforts made by the companies. Some variables were selected to represent the research problems. The most important research topics were selected based on the information that was learned and the questions that arose on the literature review. Also, the 5 aspects of efficient operations as described by Hough & Kling (2011) were included in the study as far as there was relevant information. The research topics for numerical side and their justifications are the following:

- Operational efficiency shows how efficiently the company is using its resources. Some airlines can transport a single passenger with less fuel than competitors by investing in operational efficiency, which includes dimensions of aircraft model, seating density, load factor, freight share and distance flown. (Hough & Kling 2011.) **CO2-efficiency** was selected to represent the total operational efficiency. Companies are ranked by their emissions of CO2 per one

revenue passenger kilometer (CO₂/RPK). This number was either collected from reports or calculated using the data of total revenue passenger kilometers flown and total weight of fuel used. A revenue passenger kilometer (RPK) is created when an airline carries one passenger one kilometer. This describes the **demand**, as it shows how much people are actually flying, and does not count empty seats on the plane.

- **Improvement of efficiency** was studied by comparing current performance to the year 2010. As all airlines did not publish such detailed information in year 2010, data is only from selected companies. Year 2010 was selected because it is a good indicator of the short-term development, and majority of companies had published useful data in that year.
- Relation between CO₂/RPK and CO₂/ASK (available seat kilometer) shows the **load factors** of airlines. As planes are flying with minimum amount of empty seats, the average efficiency of the flight increases. This is also beneficial for airlines as high load factors mean higher revenues, lower unit costs and possibility for lower prices. (Hough & Kling 2011.) An available seat kilometer (ASK) is created when an airline carries one **seat** for one kilometer. This shows the **supply** side of operations, as it shows how much seats airlines are offering to the market.
- **Growth rate** of each airline was calculated to find how quickly their business is growing. It is clear that even with improvements in operational efficiency, big increase of operations will lead to rising net emissions. The study investigates the growth rates of each business model compared to their improvements in operational efficiency. This was calculated by comparing revenue passenger kilometers of each airline in years 2010 and 2013.

- **Profitability** is a part of the triple bottom line, and profit and positive environmental actions are often related (Dahlsrud 2006, Elkington 2004). This study aims to find correlation between ecological flying and profit rate, and therefore the net profit percentages of each airline were calculated. Net profit percentage was chosen as it was seen as a best indicator of performance between these companies operating in the same industry. Net profit shows the profit in hand after all costs and taxes. (Investopedia 2003a.)

The data for these parts of the study can be seen in attachment 1.

The text part of the study focused on the **strategies** and **actions** taken by different airlines. These were compared against each other to find the characteristics of each model. A comparison of reported actions can be seen in attachment 2. **Reporting** of CSR actions was studied, as appropriate reporting allows companies to study, compare and share their performance, and leads to opportunities to innovate and grow. (Porter et al. 2011). In addition to these, **seat density** and **average flight lengths** were studied since they are at the heart of aircraft efficiency as described by Hough & Kling (2011). The fifth aspect of efficiency, cargo share was left unstudied as the information found was very limited and the literature review showed very clear results about the subject.

5 Results

5.1 Strategy

Only 3 out of 10 airlines studied in this thesis named CSR- and sustainability actions as a part of their core strategy. Regardless of this, all airlines saw the connection between operational efficiency and cost management, and were aiming for lower fuel use to achieve financial advantage. All airlines also connected this to more environmental performance. There was no big differences between full service- and low cost carriers. Fuel is a huge, if not the biggest, cost for any airline, and airlines agreed that lower fuel use will lead to both smaller emissions and smaller costs. As Finnair (2014a) described, in the aviation business “financial and environmental impact are in close alignment”. Finnair also described CSR as one of 4 “megatrends” that are shaping airline strategy.

2 out of 5 FSNCs mentioned CSR as a part of their core strategy. All five stated that fuel efficiency, environmental performance and financial performance were connected.

- British Airways sees CSR as an important part of their strategy, and their strategy includes a goal to “lead the industry in adopting a responsible approach to the environmental impact of aviation.” They also see these actions beneficial both for environment and the company, as fuel costs are high and “greenness” of airlines is increasingly important criteria for customers when selecting an airline.
- Finnair names corporate social responsibility an aspect of their strategy and strategy planning, and describes CSR as one of four “megatrends” that are shaping airline strategy. Finnair recognizes that CO₂ emissions are a byproduct aviation fuel, which is airline’s single largest cost item by far. They see that cost-efficiency is an important for cost competitiveness and profitable growth, and see their modern and efficient fleet as a strategic advantage.
- Delta does not directly link CSR to their strategy, but recognizes the correlation between operational efficiency and cost management. Their CSR report, on the

other hand, connects CSR with financial performance. Delta has a campaign for fuel optimization that “is a broad effort that touches numerous areas of Delta’s operation and financial strategy.”

- TAP does directly link CSR to their strategy. Still, their strategy included goals improve their cost-eficacy ratio, lower their consumption of fuel/passenger-Km and lower their CO2 emission. Also their CSR report failed to link CSR actions directly with economic performance.
- Malaysian Airlines did not mention CSR as a part of their strategy, but recognized the link between fuel efficiency and structural cost reduction. Their latest environmental report linked fuel efficiency with both cost savings and environmental responsibility.

1 out of 5 LCs mentioned CSR as a part of their core strategy. All five stated that fuel efficiency, environmental performance and financial performance were connected.

- Southwest Airlines states that triple bottom line fuels their vision and connects environmental thinking to good business sense. They see fuel savings as a critical factor to low fares and to decrease in greenhouse gas emissions.
- AirAsia does not link CSR directly to their strategy, but sees CSR very important and emphasizes its CSR actions. They link environmental responsibility to their fuel efficiency, and state that “fuel-efficiency is, in fact, central to our lean business model as it plays a critical role in keeping our costs under control.”
- EasyJet does not mention sustainability in strategy section, but sees environmental and social issues as key factors for a “successful and sustainable business.” <http://corporate.easyjet.com/sustainability.aspx>. EasyJet sees that environmental responsibility is connected to cost savings, and good environmental performance is a good way to avoid aviation restrictions and taxes.

- Norwegian Air Shuttle does not mention CSR as part of its core strategy, but sees a connection between emissions and cost savings.
- Ryanair did not link sustainability to their strategy, but operational efficiency is a key factor of their low-cost model. Even though CSR reporting of Ryanair is really primitive, the company claims to be the “greenest” European airline.

5.2 CSR actions

All airlines mentioned several ways to cut flight-related emissions, and agreed that reducing the use of fuel is beneficial for both the company and the environment. Both business models shared very similar actions in the improvement of operational efficiencies. Still, LCCs were more invested in these efficiency improvements. While LCCs were mainly focusing to maximize the efficiency of the resources, majority of the FSNCs were participating in programs with more ambitious and long-ranging goals, possible to revolutionize the aviation field.

The main approach to fuel efficiency was shared by all airlines: all airlines from both business models named new aircrafts among their most important tools in improvement of their environmental efficiency, profit or both. Airlines were at different stages of modernizing their fleet, as some airlines had finished their fleet renovation and other were in the process of doing it, or waiting for new aircraft models to be delivered. Some airlines like Ryanair and easyJet had finished majority their fleet renovation, while airlines as Norwegian and Finnair were waiting for their upcoming new, more efficient planes.

Low cost carriers were more invested in actions related to direct efficiency improvements. It should be noted that the actions listed are the ones reported by the airlines, and there might be some aspects that were left unreported. Therefore the list can only be used as an indicative. The following actions were reported more frequently by low cost carriers:

- Winglets/sharklets (5/5)
- Weight reductions of aircraft equipment (4/5)
- Improved taxi- and navigation systems (4/5)
- Regular engine wash (3/5)
- Focusing on direct flights (2/5)

Full service carriers were more likely report the following actions:

- Commitment to industry efficiency improvement goals or international regulations such as emissions trading scheme ETS (5/5)
- Involving and educating customers & staff (4/5)
- Co-operation with authorities or environmental/local organizations to create better procedures. (3/5)
- Setting their own environmental goals to reach (3/5)
- Reducing ground energy use (3/5)
- Biofuel development (1/5)

Full service carriers were often conducting or participating in sustainability projects with long visions, aiming to redesign the aviation industry. These projects are often being carried out in co-operation with authorities, scientists and organizations. Examples of these actions include the following:

- British Airways is working with Solena Fuels to design a fuel refinery plant that turns household waste into fuel. The plant will have a capacity to turn 500'000 tons of waste into enough sustainable low-carbon fuel to fuel power1000 flights from London to New York and back.
- Delta is taking part in Corporate BioFuel Program, designing future of aviation industry. Finnair has been testing biofuels since 2011, and has flown complete flights using biofuel.
- Finnair has been working together with the Finnish ANSP Finavia to create more ecological and less fuel-consuming arrival navigation systems and pat-

terns. Malaysian airlines is working with local authorities to introduce and implement new air traffic procedures.

5.3 Overall fuel efficiency

The aim for efficient use of resources can be seen in the performance of low-cost airlines. Even though low-cost carriers operate mostly short- and medium haul flights, they have much better average fuel efficiency than full service network carriers. Low-cost carriers emitted, on average, **86 grams** of CO₂ for a passenger kilometer in 2013. The same number for FSNCs was **109 grams** per passenger kilometer. On average, a low cost carrier used **27 %** less fuel to create one passenger kilometer. The trend can be clearly seen in the diagram below, with LCCs marked with red bars.

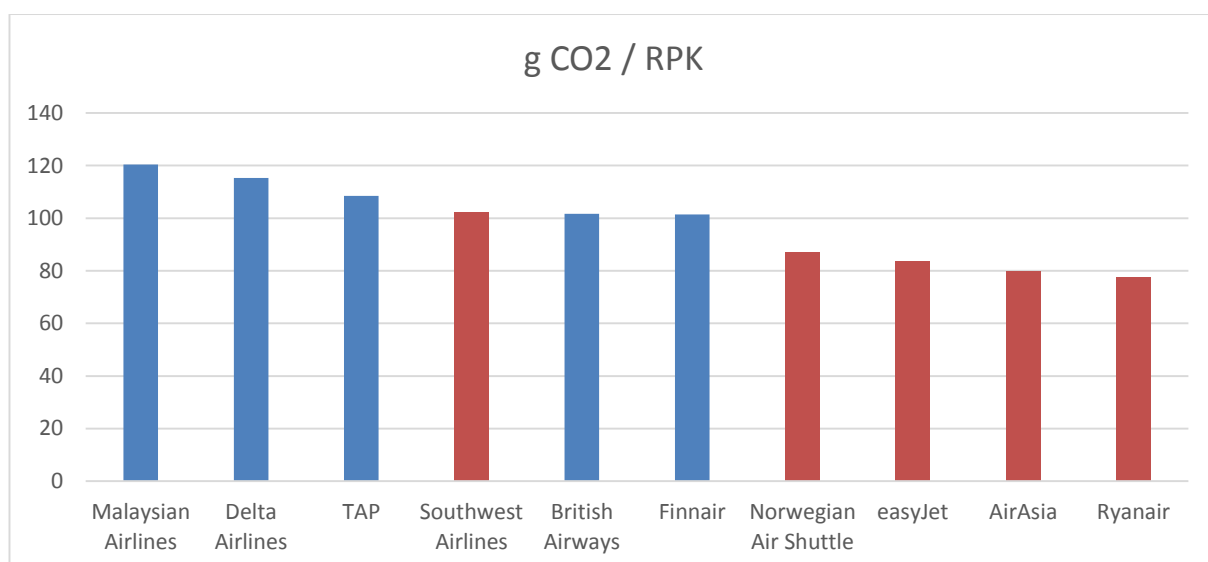


Figure 7. CO₂-efficiencies of airlines in the year 2013

Both business models had made progress in their fuel efficiency between the years 2010 and 2013. The study of fuel improvement only includes 8 airlines, as reliable data from year 2010 was not available from 2 airlines (AirAsia and Malaysian Airlines). Average efficiency improvement for low cost carriers was **1.38 %** per year, and for full service carriers **1.19 %** per year. Notably these are both lower than the industry goals of IATA of annual fuel efficiency improvement of 1.5 %.

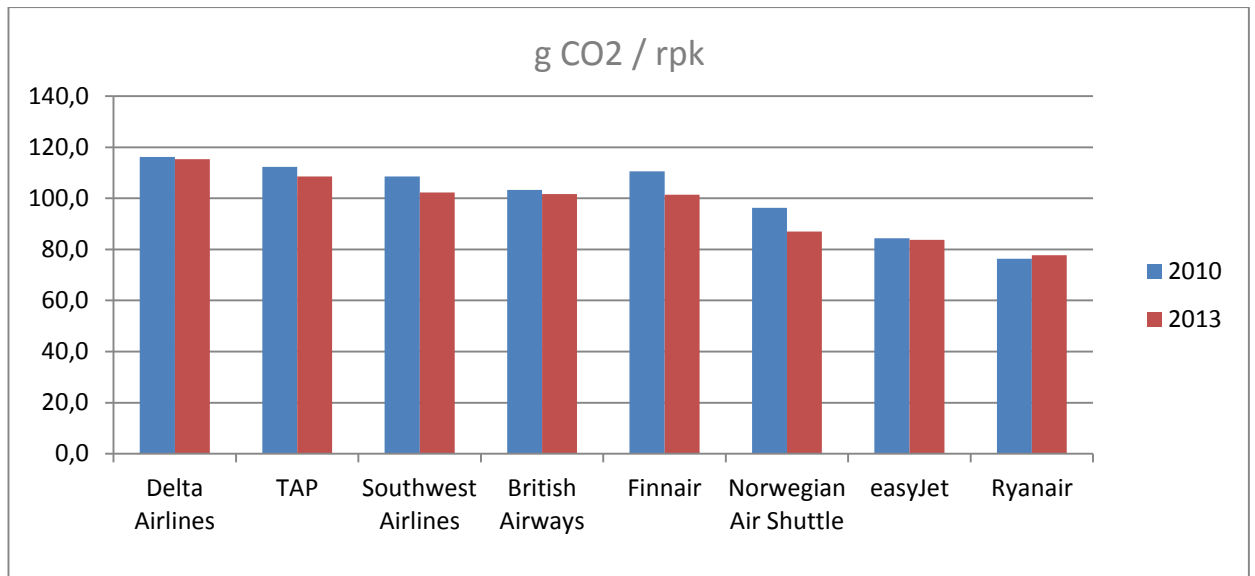


Figure 8. Fuel efficiencies in years 2010 and 2013

The trend among airlines is clearly visible, as 9 out of 10 carriers have improved their efficiency since the year 2010. It is notable that the industry leaders EasyJet and Ryanair had very low, or even negative growth in their fuel efficiencies. In fact, excluding these two companies, the average annual improvement of other 6 companies was 1.68 percent, which is higher than the industry goal. This shows that these two companies had very efficient fleet and operations already in the year 2010, and struggle to make further improvements.

5.4 Growth rate of supply

LCCs may be using less fuel for the same trip, but the growth rate of LCCs is much higher than those of full service network carriers. From year 2010 to 2013 the average ASK growth between LCCs was **11.9 %**, while at the same time ASKs of the FSNCs grew an average of **5.5 %** per year.

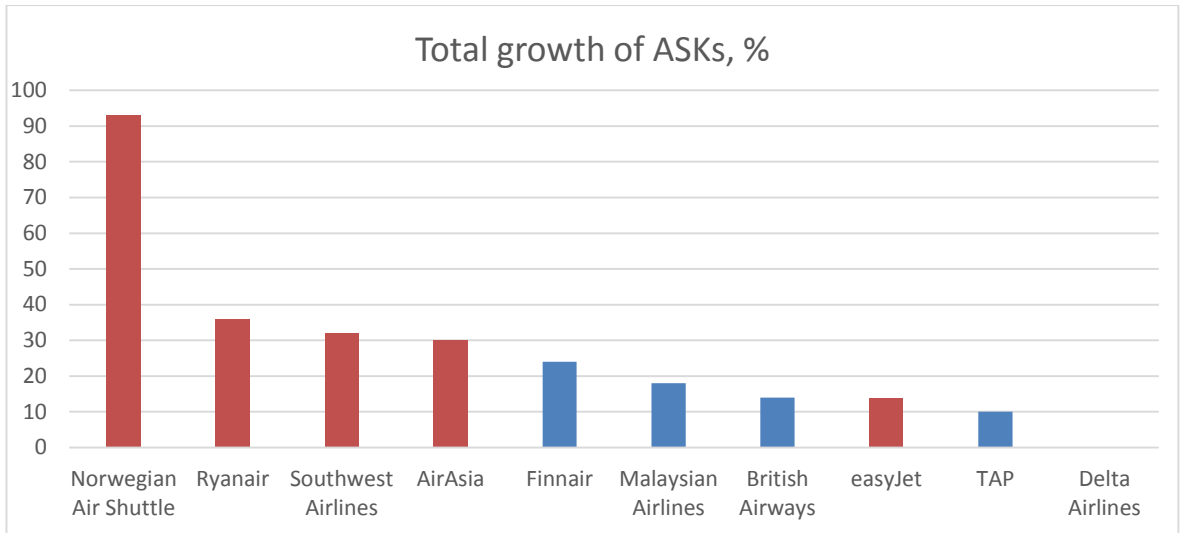


Figure 9. Growth of ASK from year 2010 to 2013

5.5 Load factors & seating density

No big differences were found in load factors of different business models, although low cost carriers had a slight advantage. Some airlines were performing extremely well, but all airlines had a high load factor of more than 78 percent. The average for low cost carriers was 81.9 % and for full service carriers 80.7 %.

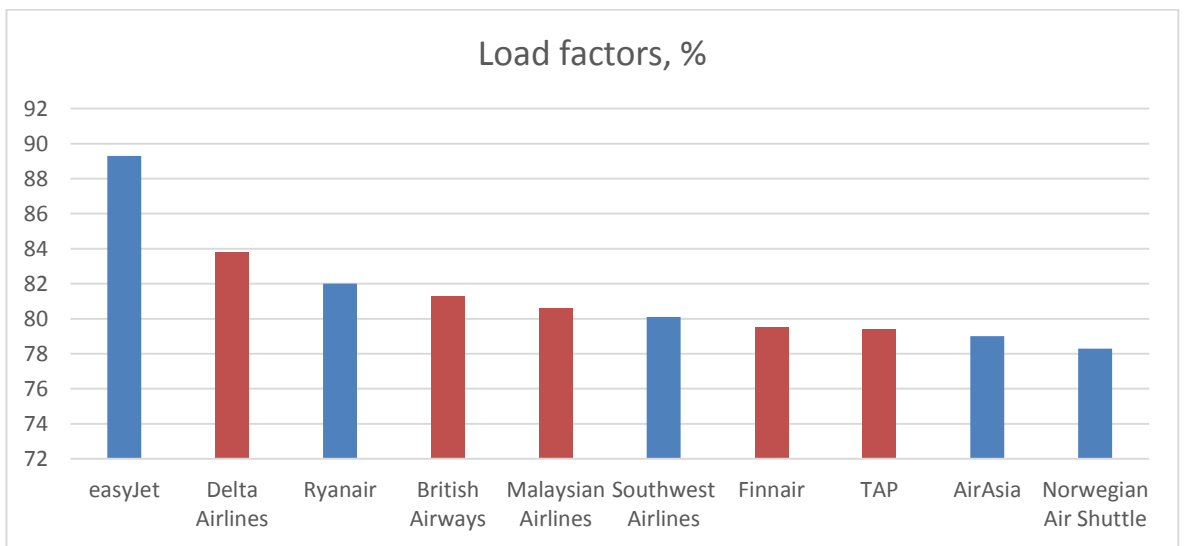


Figure 10. Load factors of airlines in the year 2013

Seat density was a challenging subject to study, as different airlines use such diverse fleets. Still, some examples of the differences were found in the study:

- Boeing 737-800: Norwegian has 1-class seating with up to 189 seats, while Delta operates the same aircraft with 3-class layout with up to 160 seats. This means that Norwegian can carry 18 % more people on the same flight.
- Airbus A320: AirAsia operates with 1-class layout of up to 180 seats, while Finnair operates 2 classes with up to 165 seats. AirAsia has 9.1 percent more capacity on the same plane.
- Boeing 787 Dreamliner: Norwegian has 2-class seating with up to 291 seats, and British Airways uses 3 service classes with up to 216 seats. Norwegian has capability to carry 35 % more passengers on the same plane.

5.6 Average flight length

4 out of 5 low cost carriers released their average stage lengths, and the average flight length between these LCCs was 1154 kilometres, with the numbers ranging from 1091 km to 1264 km. Unfortunately for the study, none of the FSNCs published their average flight distances. Some indicator can be found in the statistics of Finnair and TAP, which show that majority (55%) of Finnair's revenue passenger kilometers came from scheduled long-haul flights to Asia and America, with distances up to more than 9000 km. 29% of TAP passengers travelled on long-haul flights.

Only 29 % of Finnair's RPKs came from European routes and 3 % from domestic routes. 61 % of tap passengers flew intra-European flights, and 5 percent domestic flights. Clearly this does not provide specific information about the average stage lengths, but shows that a big part of FSNC traffic comes from very long haul flights. At the same time FSNCs operate short domestic flights, showing that they have very varied route structure, as described in the literature review. It should be noted that Finnair's part of domestic flight is of course much higher than 3 percent, as one short flight with small plane produces much less RPKs than a long-haul flight with wide-body aircraft.

5.7 Economic performance

8 out of 10 airlines made net profit in the year 2013. Low cost carriers outperformed their full service rivals in both net profit and net profit percentage. All LCCs experienced net profit, with an average net profit percentage of 6.9 %. Only 2 FSNCs made substantial profit, but because of their high turnover, the profit percentage is small. 2 FSNCs were close to the dead even line, and one airline was making substantial losses. It should be noted that data for Delta Airlines is from year 2012. This is because of their tax assets in year 2013. In 2013 Delta did not pay taxes and it received 8 billion USD as income tax benefit. This resulted to net profit of 10.54 billion USD, or a net profit percentage of 28 %.

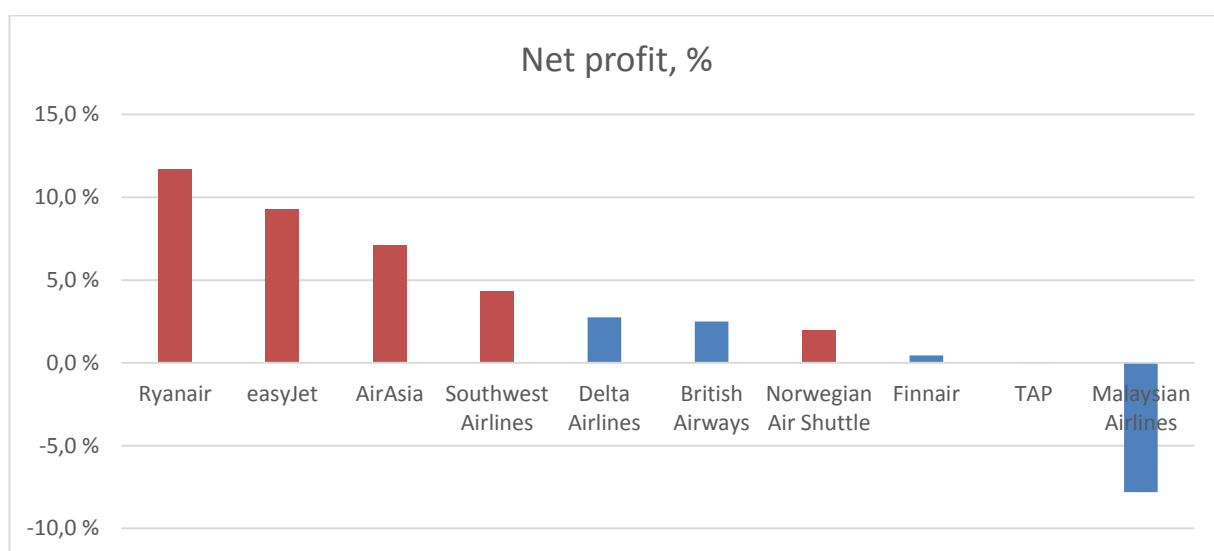


Figure 11. Net profit margins of the airlines studied in the year 2013 (Data for Delta from year 2012)

5.8 Reporting

The study shows that reporting of CSR-related actions has increased in the recent years. In the year 2009 only 34 % of alliance member airlines released CSR reports, and in 2011 the CSR actions of low cost carriers were seen nearly invisible for outside observers. (Cowper-Smith & Grosbois 2011, Coles et al. 2010.) Contrary to this, the study revealed that majority of companies from both business models were now much more invested in CSR reporting, as 9 out of 10 airlines reported corporate social responsibility in some way.

Still, there was big differences in the reporting methods between the two business models. All FSNCs published separate annual sustainability- or CSR reports, and one company had proceeded to build their whole annual report based on GRI articles. Reporting methods of low cost carriers were less standardized, containing mainly figures, facts and methods they were using to cut their emissions. All 5 full service carriers used GRI guidelines in their reporting, while the number along low cost carriers was only one.

6 Discussion

6.1 Strategic CSR and CSR actions

Engagement of direct CSR actions into strategy was found to be low between both business models. Some full service carriers are acting as leaders of the industry, but most others failed to link CSR with their strategy. Regardless of this, it is notable that all airlines recognized a relationship between fuel efficiency and cost savings, and nearly all incorporated efficient operations in their strategies. It could be said that all airlines were aiming for higher operational efficiency, which means also lower ecological impact. Basically the airlines were on a very environmentally healthy background, even though they didn't mention it themselves.

The study of CSR actions did not bring up many new facts, but the findings were very similar than the results described in the literature review by, among others, Reichmuth et al. (2008). The methods of cutting emissions have not changed very much in the recent years, even though some new technologies as winglets have gained popularity in the recent years. Low cost carriers are clearly further in their actions, and use efficiency improvements very heavily. They could be seen as the forerunners of efficiency improvements, with FSNCs following some steps behind. At the same time several FSNCs were developing technologies of the future, with possibilities to substantial environmental benefits coming in near future. In the long run these actions may prove to be much more powerful as mere efficiency improvements.

6.2 Current impact and the development

The difference between the business models is clear, and low cost carriers are using far less fuel per passenger kilometer. Basically this means that if a customer flies from city A to city B, he will have substantially lower ecological impact if he chooses a low cost carrier. Also, for the airline, the unit price per passenger is much lower on the LCC model. Additional savings on emissions and costs occur also as low-cost carriers fly point-to-point instead of flying through a hub. This study suggests that a low-cost carrier is clearly the greener choice of the two airline business models, at least if the situation is only observed based on a single flight.

Low cost carriers have high motives to achieve high efficiency, as their business is based on minimizing costs, and their main expense is fuel. Full service network carriers are still far behind, but this can be partly explained by their business model. Different service classes require different space, equipment and systems. The reasons for the differences can be studied through the 5 steps of efficient flight operations, as stated by Huegh & Kling (2011): aircraft model, seating density, load factor, freight share and distance flown. Low cost carriers achieve advantage especially in seating density and lack of on-board cargo. Full service carriers may have advantage as big parts of their operations are more fuel-efficient long-haul flights. Aircraft models and seating density are very similar between different business models. These five aspects are studied in detail below.

6.2.1 Aircraft model

All airlines from both business models stated that new, efficient planes were one of their most important tools to increase their efficiency, cut their environmental impact or both. Airlines were at different stages of modernizing their fleet, which means that some airlines were expecting more future changes than others, which had already achieved higher efficiencies. Notable, the industry leaders Ryanair and EasyJet had a very standardized and efficient fleet, but did not have any more significant fleet improvements coming in near future. While especially many of the full service carriers were expecting new equipment in the near future, the gap between business models may be expected to get smaller.

6.2.2 Load factors and seating density

Study found no significant differences in load factors between the business models. Some were performing especially well and one LCC reached a load factor of nearly 90 percent, but the average of both business models were very similar. All airlines had high load factors of more than 78 percent, which tells that they are all doing good work to keep their planes full. Still, the difference between the best and the worst performer was more than 10 percentage points. This shows that there is a still lot of room for

improvements for many airlines. Regardless of this, the difference between efficiencies cannot be explained by load factors.

The study revealed that full service carriers tend to have much lower seat densities than LCCs, and this difference can be up to 35 percent. As stated by Reichmuth et al. (2008) and Wulf (2010), one of the characteristics of FSNCs is its many service classes, from economy to first class, while LCCs tend to operate only one, densely packed service class. Higher service classes require more space and more facilities, and this leads to a plane equipped with fewer seats and possibly more weight than the same plane operated by a low cost carrier. Fewer seats mean less people travelling per plane, and that will lead to higher fuel use, higher emissions and higher unit costs per passenger. Fewer seats per plane will lead to a need of more aircrafts and flights. These factors can be seen as very important aspects especially when the load factors of business models are so similar.

It could be said that flying in first- or business class has higher ecological impact than economy class, and FSNCs are the ones supporting this behavior. It should be noted that high yield passengers are an important part of FSNC strategy and business travel is very unlikely to reduce in substantial matter. Therefore it might be very hard to find solutions for the problem. This being said, the share of premium passengers has substantially decreased since the last economic downturn, and has not recovered on the same pace as economy travel (Vogel 2014). It is very likely that if this trend continues and premium traffic share keeps on declining, FSNCs will react by using less higher class seats, leading to higher seat load and lower unit emissions. This would clearly lead to better fuel efficiency. At the same time some LCCs are moving closer to FSNC model, and introducing higher service classes. Still, with the need for higher classes, it will probably be impossible for FSNCs to ever achieve same seat densities, and thus efficiencies than LCCs.

6.2.3 Distance flown

The study failed to study the differences of the average flight distances between the business models. The study showed that low cost carriers have, on average, short

lengths of less than 1200 km. This number was very similar between all the LCCs that published this information. This is very interesting as the literature review showed that shorter flights have higher ecological (and economic) impact (Huegh & Kling 2011). Therefore LCCs have a disadvantage against full service carriers that base a big part of their flight operations on more ecological long-haul flights. Still LCCs have achieved much higher operational efficiencies. This is an interesting fact, and is further prove of the good overall processes of LCCs.

6.2.4 Cargo share

This study did not study the cargo share between the business models, as the difference was clearly stated in the literacy review. Low cost carriers do not carry external cargo, and full service carriers use their belly capacity to deliver freight (Reichmuth et al. 2008, Vogel 2014). The strategy of FSNCs leads to higher fuel use, emissions and costs, but also to more revenue per flight. It is clear that the freight share explains a part of the difference between the business models, and the relation between ecological impacts and economic benefits of belly cargo would be an interesting subject of further study. Air cargo leads to certain benefits as described earlier by World Bank (2011a) and NBAA (2011) and to financial benefits for the company. Still, the benefits and disadvantages of air cargo should be studied in more detail, and if seen necessary, more effort could be put on deeper co-operation with train- truck- and shipping companies.

6.3 Development of environmental impact

The study confirms the results of Dobruszkes (2013), claiming that the historical growth rate of low cost carriers has been faster than the growth rate of FSNCs. (2013). It is notable that the growth rates of both business models is much higher than the IATA goals of efficiency improvements of 1.5 % per year, inevitably leading to raising net emissions. As this goal wasn't even reached by either business model, the realistic situation is even worse. This is especially true with LCCs, as their growth rate is almost 10 times higher than their efficiency improvements. This is very disturbing information concerning the ambitious future goals of the industry. Carbon-neutral growth from 2020 would probably require revolutionary technology improvements, strict emission limits or affordable biofuels.

It was notable that the 2 most efficient airlines made very low, or even negative, progress in the years 2010-2013. Meanwhile all other carriers were improving their performance, closing the gap to the industry leaders. An important reason for this is undoubtedly the different stages of fleet renovation, and the top 2 airlines had already finished their fleet renovations in year 2010, and had only minor changes after that. This fact raises concerning questions about the capability of airlines to keep on improving their fuel efficiency and keeping up with the industry goals. It seems as there is some limit that can be achieved with the current equipment and practices. As airlines follow the same procedures and the most efficient planes are filled to the maximum capacity and with maximum seat density, further improvements are hard to achieve. Next big efficiency improvement might only come with future fleet renovation, but the demand and ASKs are continuously growing at fast pace.

Because there seems to be limits for efficiency improvements and the performance is determined by the technology available, the future of green aviation seems may rely on new, groundbreaking techniques such as efficient, affordable and environmentally friendly biofuels. As stated earlier, low cost carriers demonstrate commitment to efficiency improvements by investing in the latest, most efficient technologies and using them in as efficiently as possible. Full service network carriers aim for the same but their business model prevents them from achieving their full possibilities. Still, FSNCs invest in the future of aviation by developing completely new technologies and procedures. They drive the development of green practices in the long run, creating greener and more cost-efficient future for aviation. Therefore it should be noted that if successful, over long time periods full service carriers may have much bigger impact on the industry than low cost carriers. It could be stated that while low-cost carriers focus on short-term cost- and emission minimizing, FSNCs focus more on long-term development of the industry.

It is notable that the biggest European low cost carrier Ryanair reported that their strategy consists of making new demand, instead of fighting for existing demand. This confirms the data described by Vogel (2014), which stated that a large part of LCC growth comes from new passengers instead of “stolen” passengers. While other LCCs

do not mention this in their strategy or other releases, they still operate on a very similar model and doubtfully operate partly using a similar strategy. This of course leads to more flights and more emissions. On the other hand, by “stealing” passengers from full service carriers, low cost carriers will lower the total emissions of the industry. This can be explained as the passengers change to airlines with higher efficiencies and fly more direct flights. This is of course positive development, and choosing a low cost carrier instead of FSNC is clearly a positive action for the environment.

According to the study, it is clear that the total impact of the aviation industry is very unlikely to get smaller without revolutionary technologies. Efficiency improvements do not keep up with the growth of demand and supply, which can be expected to rise sharply in the coming decades. Although it was not a subject of this thesis, the growth and affluence of world population is driving economic growth around the world. This is especially true in developing countries with rising incomes living standards. People with have more money and more free time will travel more, and the amount of GDP correlates closely, and even exponentially, with the number of yearly flights per person (Morphet 2011.) The latest predictions from October 2014 show that air traffic is expected to more than double in the next 20 years, with the majority of growth will be coming from outside of Europe and U.S., with the majority of growth happening in Asia-Pacific, Latin America, Middle East and Africa. The U.S. and Europe will have the lowest growth rates. (IATA 2014c.) In the light of this study, these observations seem concerning and create a need for even greater and faster actions. It must be made sure that the decisions that are made will be global and influence every player on the field.

6.4 Economic performance

Low cost model is clearly economically more successful model at the moment. 4 best performers were low cost carriers, and all made profit in the year 2013. Full service carriers seem to be struggling on dead even point or are making losses. Some full service carriers made substantial profits, but because of their big size the net profit percentage is small. This also means that profit per flight, passenger and RPK is smaller than low cost competitors.

As both business models operate with similar equipment and similar load factors, this economic advantage cannot be explained solely with the fast growth of LCCs. Low cost carriers perform much better, even though they use the same resources on the same market environments. This thesis did not study the individual factors of airline revenues and costs, but the study gives a good reason to believe that the 27 % efficiency difference has a big impact to the economic results. Generally the LCC model seems to be much more suitable for current market environment. It is clear that other factors, and especially cost savings, contribute to this result as well. Researching the most important factors would be interesting subject of further study.

If this trend of LCC growth continues in the future and FSNCs keep on struggling, the future does not look bright for the full service carriers. They need to adapt their strategies to the changing business environment, and as stated in the literature review, this can already be seen in the field. Fageda, Suau-Sánchez, Mason (2014) state that FSNCs adopt more and more features from the low cost model, and vice versa. According to the results of the study, this is very justified development for FSNCs, and evolving of business model could be seen vital for the future of full service carriers. At the same time low cost carriers are adopting features of FSNC, differentiating their product from their low cost competitors and aiming for higher yields, for example by offering more than 1 service class. (Fageda, Suau-Sánchez, Mason 2014.) If this trend continues, it might be expected that the difference between business models would get smaller. On the other hand that would be negative for the green impact of the low cost carriers.

6.5 Reporting of CSR

Reporting methods were very different between business models. FSNCs were very involved in reporting, while low cost carriers settled for less comprehensive reports. The share of airlines reporting their actions increased every year. This study revealed that reporting has increased a lot in few years since the studies of Cowper-Smith & Grosbois (2011) and Coles et al. (2010) and Heeres et al (2011), at least between full service carriers. Still, the considerable differences between business models are worrying. FSNCs are very invested in CSR reporting, but low cost carriers are still far be-

hind. This is concerning, as LCCs are the ones who are doing well, and openness and discussion with them could lead other airlines, and most importantly the whole industry, to a better direction.

Also, majority of FSNCs created their CSR- or sustainability reports on the base of GRI, making the reports more reliable. Meanwhile the reports of LCCs were more varied, less comprehensive and lacked standardized methods of reporting. Because of this, it is possible to leave unwanted information out of the report. Also, LCCs could hide their success factors to preserve their advantages. Openness and guidelines are needed for all airlines regardless of their business models. As stated earlier, open and reliable data allows airlines to compare their results and to find better ways of operation, and drives innovation and growth (Porter et al. 2011, Ghuliani 2013). More open data and discussion is needed from all players of the field to drive the whole industry in a better direction.

6.6 Usability of this study

This study acts as an eye-opener and a guide towards the right direction for airlines that are considering their future concerning emissions and profitability. This work also calls for airlines to engage to closer co-operation, closer discussion and better reporting of CSR actions. This research was conducted to study the current situation on the field and to find out areas on which to invest in the future. This is important information for policymakers and provides reference to the decision-making of near future. This is crucial, as the growth that is much higher than efficiency improvements is not sustainable development, and this is an issue that may only be solved with environmental policies and multinational agreements. This thesis also provides information to a conscious consumer interested in his/her ecologic footprint while flying. With this information the consumer can make more informed decisions when choosing an airline.

6.7 Validity and reliability of the study

The airlines and the research approach were selected in basis to obtain as reliable and valid data for the study as possible. Qualitative research method opened possibilities for a more open, flexible and in-depth analysis. This allowed focusing on the research

questions chosen, and studying them in great detail. The data answered the research questions well, and was very valid for the subjects studied. Although the data was very vast, consisting of full annual reports with huge amounts of data, the study could focus only on the most valid details. Therefore the validity of the study can be seen as good.

The data used for both the literature review and the study is very comprehensive and up-to-date, and the author sees the data reliable. Even though the sources for the literature review were numerous and the data for the study was very recent, the reliability of these sources must be questioned. A great part of the data was from the internet, but the sources were carefully selected to provide maximum possible reliability, focusing on the most reliable data from respected authors, magazines and books. Data used for the research was data published for company investors and other shareholders, and can be seen reliable. An important question to ask is what the companies left out of their publications - if a company wants to hide something, it could left it out from their reports. Also, they could easily over-exaggerate their positive results while understating negative effects. Still, majority of the study focused on numeric data that can be seen reliable. In total, the author sees the data as reliable and appropriate for the study.

The sample size was quite small, and it is questionable how well the sample represents the entire population. The author recognizes that there may be certain inaccuracies, but the key findings of the study were so clear and comprehensive that the author claims that the study gives a clear indicator if the current trends and situation. The airlines were not selected at random, but as airline pairs competing on the same area. Even though they do have overlapping market areas, they do not serve exactly same routes. Also, business models have very different route structures, which makes comparison hard. Flights of different lengths have different environmental impacts, and other carriers are more invested in long-haul flights while others fly shorter legs. Still, all these aspects were taken into account while conducting the study and the discussion.

7 Writing process and areas of future study

7.1 Creation process and personal development

I decided my area of study in the end of year 2013, as I attended a course of responsible business management and got very interested in the subject. As I was interested in the aviation field and as I was going to do my specialization studies in the subject of Aviation Management, I decided to combine the two and research corporate social responsibility in the aviation field. During my specialization studies in the IUBH - School of Business and Management I deepened my knowledge in the field of aviation, constantly looking for ideas for my upcoming thesis. After returning to Finland I started to work on the thesis and to limit the subject. As a comprehensive study of the whole subject of CSR would have been very broad and would have required massive amounts of study and data, I decided to focus on the sub-part of CSR that I found most current and interesting. Therefore I decided to study specifically the impact to the atmosphere.

The thesis progressed steadily for a period of three months, starting with study of literature review and leading to the research and analysis of the results. During the process I was helped by my thesis advisor, with whom I met frequently every few weeks. This helped me to keep the work on the right track and to focus on the right aspects.

The creation of this work and study was a very educational experience for me as the author. I was happy that I was able to choose the subject according to my own interests, and to focus on the areas most relevant for me. Therefore it was beneficial for me to do an independent work without a commission from any company. I was happy to use, and to strengthen, the things I learned on my specialization studies of both aviation management and responsible business management. Working on this paper has allowed me to get a deeper insight of the aviation field, its players and the current situation. During the writing process I have not only learned a lot, but also found new areas of interest inside the field. In addition to these aspects, working on this paper has strengthened my skills me to write texts in an academic style. All these new and improved skills and knowledge will most definitely help me on my future career.

7.2 Topicality of the study

Current news increase the importance of fast reaction to the situation. The latest reports show that the situation of global warming may be worse than even seen before, and leading towards irreversible consequences. In November 2014 IPCC (International Panel on Climate Change) called the policymakers and decision makers around the world to take action in fighting climate change and reducing emissions. IPCC even called for fossil-fuel free world in the year 2100. (IPCC 2014.) As aviation is a big and growing source of emissions, they have to play their part in the battle against climate change. The responsibility for this falls for policymakers, airlines, manufacturers and the consumers who are flying. To reach ambitious goals all must work together in the development of new, revolutionary technologies and procedures. The subject also requires additional research to keep the participants informed and to provide essential information for the field.

7.3 Topics of future research

There are still many subjects to study in the future. LCCs and FSNCs are not the only players of the aviation field, although they represent the biggest players of the field. The impacts of regional carriers, holiday carriers, all-cargo airlines, integrators and general aviation all add up on the top of the two biggest business models. The study of these additional business models would be important for the future development of the field.

CSR field includes many other parts than the responsibility of CO₂ emissions. This thesis focused on environmental and financial aspects, and the third pillar of triple bottom line, the society, was left unstudied in this thesis. It is questionable how different business models impact their personnel and the societies around them. Good performance in some fields might be balanced with poorer in others. The study focused on the climatic impacts, which itself is even a subpart of the environmental part of CSR. These different aspects of corporate social responsibility would definitely be a crucial aspect of future study.

Airlines have very different route structures, and they have flights of very different lengths. Their fleet also varies from airline to another. The effects and profitability of different aircraft models could be studied to facilitate the choosing of the right aircraft for routes of different lengths. Also, the idea of airline co-operation with land-based transportation models might be explored to eliminate the need for the most polluting very short-haul flights. The aspect of contrails of different aircrafts could be added to the research, as they may have an additional warming effect (IPCC 1999). The effects of contrails were not included in this study, and the contrail impact of different aircrafts and business models should be studied.

In general terms, the results of this study should be updated frequently every few years to see how the development is going. This is important to see how both business models are developing, are the industry goals reached and what new actions and operations have been invented.

7.4 Final words

In conclusion, airlines are operating under a lot of pressure. The competitive environment is very challenging, margins are small, environmental organizations and policy-makers are driving greener procedures and economic cycles bring a great amount of uncertainty. Some airlines are doing well in their efficient operations and one business models are ahead the other. Still, every player of the field must do their part in the development for a greener future. Airlines do recognize the severity of their environmental effects, but have to balance their triple bottom line and to keep profitable to keep on the market. Fortunately for airlines, in the aviation industry green performance and financial performance are closely related. The future of air travel might depend on the actions that are made, and greener future can be achieved by well-planned co-operation and innovation.

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Attachment 1. Excel sheet of the key figures.

	Weight of fuel used, kg, year 2013	Amount of CO2 created, kg, year 2013	Amount of CO2 created, kg, year 2010	Growth of RPKs 2010-2013, %	Growth of ASKs 2010-2013, %	Grams of CO2 / RPK, year 2010	Grams of CO2 / RPK, year 2013	Grams of CO2 / ASK, year 2013	Grams of CO2 / ASK, year 2010	Use of GRI
Delta Airlines	11565300000	36176258400	36135281600			116,2	115	96,5837		
Norwegian Air Shuttle	735006000	2299098768	1325280424			96,2	87	67		
Finnair	741883000	2320610024	2204880280			110,5	101	81,6		
Ryanair	2392924747	7485068609	5505280000			76,3	78	63,9		
Malaysian Airlines	1860000000	5818080000	(not available)			(not available)	120	97,1		
AirAsia	644595000	2016293160	(not available)			(not available)	80	63,8		
Southwest Airlines	5492037505	17179093316	13630554397			108,5	102	81,9		
British Airways	5668473000	13356566100	11450908300			103,3	101,7	82,7		
easyJet	1775166240	5552720000	4737203200			84,4	84	74,8		
TAP	976982097,2	3056000000	2690080000			112,3	109	86,2		
	RPKs in the year 2013	RPKs in the year 2010	Growth of RPKs 2010-2013, %	Growth of ASKs 2010-2013, %	ASKs, year 2013	ASKs, year 2010	ASKs, year 2010	ASKs, year 2010	ASKs, year 2010	Use of GRI
Delta Airlines	313802767872	310875371136	1 %	0,024 %	374558722560	374468599296	GRI	GRI		
Norwegian Air Shuttle	26881000000	13774000000	95 %	93 %	34318000000	17804000000	no	no		
Finnair	2477600000	19222000000	29 %	24 %	31162000000	25127000000	GRI	GRI		
Ryanair	96344345177	72164710981	34 %	36 %	1,17208E+11	86051037460	no	no		
Malaysian Airlines	48323213000	38652874000	25 %	18 %	59931781000	50818000000	GRI	GRI		
AirAsia	25333000000	18499000000	37 %	30 %	31582000000	24362000000	no	no		
Southwest Airlines	1,67932E+11	1,25604E+11	34 %	32 %	2,09768E+11	1,58419E+11	GRI	GRI		
British Airways	1,31333E+11	1,10851E+11	18 %	14 %	1,61444E+11	1,41178E+11	GRI	GRI		
easyJet	67573000000	56128000000	20 %	14 %	74223000000	64945000000	no	no		
TAP	28154000000	23944000000	18 %	10 %	35449000000	32138000000	GRI	GRI		
	Calculated load factor, year 2013	Average length of flight	Profit, millions, year 2013	Profit percentage, year 2013						
Delta Airlines	83,8		1009*	2,8 %						
Norwegian Air Shuttle	77,0		38,7	2,0 %						
Finnair	80,5		11	0,46 %						
Ryanair	82,2	1264	569	11,7 %						
Malaysian Airlines	80,6		-238	-7,8 %						
AirAsia	80,2	1144	87,4	7,1 %						
Southwest Airlines	80,1	1115	582	4,3 %						
British Airways	81,3		358	2,5 %						
easyJet	89,3	1091	500	9,3 %						
TAP	79,4		-5,9	0,00 %						

* = 2012 data

Attachment 2. Excel sheet of the CSR-related action reported by airlines.

	British Airways	Delta Airlines	Finnair	TAP	Malaysian Airlines	Southwest	Norwegian Air Shuttle	Ryanair	AirAsia	easyJet
Working with authorities, environmental/local organizations	X	X	X				X		X	
Commit to ICAO & UN goals / emission trading compliance	X	X	X	X	X	X				X
Biofuel development	X									
New aircrafts	X	X	X	X	X	X	X	X	X	X
Reduce ground energy use	X		X	X					X	X
Involving & educating customers & staff	X	X	X	X						
Setting environmental goals to reach	X	X	X				X			X
Computer environmental data mgmt. system		X								
Set rules and regulations to follow, "make regulation"		X		X						

A/C equipment weight reductions			X	X		X	X		X	X
Improved taxi & navigation systems			X			X	X		X	X
Winglets/sharklets (3-4% fuel save)			X	X		X	X	X	X	X
Engine wash				X		X	X		X	
Direct flights							X	X		
High seat density								X		
High load factors								X		
Secondary airports								X		
