

PROCEEDINGS OF THE FIRST INTERNATIONAL AVIATION CONFERENCE,
IAMC – 2012, DUBAI, UAE, 18 – 20 NOVEMBER 2012

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AVIATION CONFERENCE**

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Foreword

Ahmad A. Al Ali

Vice-Chancellor, Emirates Aviation College, Dubai

The steady growth in the various sectors of the aviation industry, which is clearly indicated by the current contribution to global GDP, necessitates the need for more research on the key issues that impact this industry. These include commercial challenges, environmental impacts, new technologies, and legal/political issues.

The first International Aviation Management Conference (IAMC) was organized by Emirates Aviation College in Dubai, to provide a global platform where aviation management professionals, from both the industry and academia, come together to discuss the key strategic issues facing the industry and present contemporary research findings.

This document summarizes the proceedings of the first IAMC, held in Dubai from 18 to 20 November 2012. The research papers that are included in this document were accepted following a blind peer-review process. I would like to thank the keynote speakers for their vigorous and expert participation, and the authors of the research papers for their valuable presentations.

My appreciation goes to the distinguished sponsors who are supporting this event, to the Editor of the Proceedings, and to the members of the Technical Committee who devoted their time and expertise to ensure compliance with the highest quality standards.

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Keynote Speakers

Keynote Speakers

Keynote Speaker	Title
Mr Gary Chapman, President - Group Services and dnata	Emirates...More than an Airline
Mr Omar Bin Ghalib, Deputy Director General - GCAA	Journey of UAE General Civil Aviation Authority in Safety Management
Major-General Ahmad Bin Thani	Security Measures and Stages in Terminal 3 Opening (Dubai Airport)
Mr Mike Bair, Senior VP of Marketing for Boeing Commercial Airplanes	Challenges of the Future: An Airplane Manufacturer's Perspective
Mr Hussein Dabbas, IATA Regional VP for the Middle East and North Africa	Contemporary Industry Scenario and Strategic Challenges
Mr George Horan, President - Dubai Duty Free	The Importance of Non-Aero Revenues
Mr Chris Garton, Senior VP of Operations - Dubai Airports	Airports - Closing the Gap on Process Capability
Mr Saleh Al Geziry, Director Overseas Promotions and Inward Mission - DTCM	The Importance of a Focussed Aviation Strategy in Developing a World-Class Hub for Tourism
Mr Thierry Antinori, Executive VP - Passenger Sales Worldwide – Emirates Airline	Global Aviation Landscape: Opportunities and Challenges for Emirates
Captain Aysha Al Hamli, UAE Permanent Representative on ICAO Council	Impact of Aero-Political Regulations on Aviation Industry and Global Economy
Mr David Bruner, VP Global Communication System - Panasonic Avionics Corporation	IFEC Future Trends & Technology

The importance of a focussed aviation strategy in developing a world-class hub for tourism

Saleh Al Geziry

Overseas Promotions and Inward Mission
Department of Tourism and Commerce Marketing, Dubai

Abstract of speech

Focussed teamwork and policies compatible with easily accessible transport facilities play a fundamental role in the development of any tourism destination. Moreover, the transport industry can be a major beneficiary of tourism because of the additional passenger demand that may be generated.

The tourism sector is highly dependent on aviation, immigration, destination and trading, and unless policies at the governmental level are flexible and compatible to the growth of the tourism sector, a destination cannot possibly become a tourism hub.

Given the correlation between the aviation and tourism, the economic success of one has a ripple effect on the other; and it is a ripple effect that keeps on spreading through to the service and hospitality sectors.

Impact of aero-political regulations on the aviation industry and the global economy

Aysha Al Hamili

Council of the International Civil Aviation Organization (ICAO), UAE Permanent Representative

Summary of speech

Oxford Economics estimates that aviation's global economic impact is roughly USD 2.2 trillion. It supports 3.5% of global Gross Domestic Product (GDP). Aviation is a strategic policy imperative for the UAE. It is a core sector of the UAE's economy driving development and diversification, and aviation-related activities are major contributors to the UAE's non-oil GDP. Aviation is perceived as a catalytic element of the economic supply chain. It is a vehicle through which to achieve economic and social development.

Aviation brings benefits to the UAE's economy in more ways than its own economic footprint. The key sectors of travel and tourism, financial and professional services, and logistics all rely on the aviation sector for their success. Make no mistake, without the aviation sector it is hard to imagine the success story of the UAE.

Based on ICAO statistics, the UAE was ranked 19th in the world in terms of its international Route Tonne Kilometres (RTKs) in 2000, but it maintained an annual average growth rate of 22.8% for the subsequent nine years compared to a global average growth rate of 2.8%. By the end of the decade the UAE's ranking rose to fifth.

According to ICAO, the forecast for the Middle East region is to continue growing at a rate of 6.7% *per annum* in the period to 2025, above the global average rate of 6.0%. The UAE's traffic is, however, expected to grow by more than 10% *per annum*. This is partly the result of the strong growth in the UAE's population, foreign employment and incomes, and it is also because the UAE's carriers are able to compete effectively for transcontinental flows using their strategically located hubs.

The UAE is connected to over 220 direct destinations worldwide. More than 100 foreign airlines serve the UAE. In 2011, UAE airports handled 70 million passengers. The secret behind such impressive figures is no other than a long standing "open skies" policy that has materialized in negotiating bilateral agreements with over 150 states in the world, 110 of which are reciprocally "open skies" or fully liberal agreements.

The most global of all industries is still governed by restrictive rules adopted almost 70 years ago – at a time when international civil aviation was the exclusive privilege of no more than 9 million passengers. It begs the question whether the regulatory regime is adequate to support 2.5 billion passengers every year – the size of the market today.

Aviation and tourism could play a much greater role in any country's economic development, but antiquated market access rules are still a major impediment around the world. There is a strong case for a much greater role for both industry and government to pursue the benefits of liberalization. A myriad of different regulatory barriers continues to impair the efficiency of the air transport system and to inhibit the growth of tourism, trade and social interaction. This speech examines how some aero-political regulation hampers the development of the healthy growth of the aviation industry and the global economy.

IFEC future trends and technology

David Bruner

Global Communication System
Panasonic Avionics Corporation

Abstract of speech

This is just the beginning ...

With the introduction of Panasonic's eXConnect global broadband service, airlines now have the ability to provide always-on, low-cost, global, IP connectivity to every aircraft across their fleet.

Now what will you do with this capability?

Leading airline marketing teams from around the world have already begun connecting their passengers. They understand that today's travellers want the "Option" to be connected. When they do wish to be "on and available" they want all the same communications options they have on the ground. They want the same bandwidth and the same applications – and, of course, they want it all for a reasonable price.

They want full use of their "smart 'phones" like the iPhone and Android-enabled handsets, which operate over GSM or WIFI. They want to do serious work and serious Internet surfing using their iPads, tablet computers, netbooks and good-old-fashion laptops. And with eXConnect, now they can.

eXConnect's broadband service, however, extends beyond just personal communications devices. If a passenger needs simple access or kiosk-style interaction with the Internet they can have it now *via* Panasonic's in-flight entertainment system. From the comfort of their seat they can Instant Message (IM), update their Facebook status, or Tweet to their hearts' content, without reaching for their own device. Airlines can also offer live television through Panasonic's eXTV service, which includes news, business and real-time market news and of course, and especially, live sports.

Broadband connectivity also offers airlines new opportunities to drive ancillary revenue. Carriers can elevate and expand the passenger in-flight experience by providing services such as a virtual onboard shopping mall, a digital library containing thousands of magazines or books in any language, media of all kinds and in all languages. It even enables services such as in-flight reservations and sales for flights, cars, hotels and excursions.

What can broadband connectivity offer airline technical operations leaders and sales distribution leaders? What if you are a third-party avionics supplier or engine manufacturer – how can you use this network? What's in store for you?

It starts with system health monitoring. Panasonic is using its own network to monitor its own communication system on each aircraft in flight. It will also monitor its own In-flight Entertainment systems as well. Really, any computer onboard the aircraft can now be monitored in real-time.

It doesn't stop there. Broadband connectivity can offer solutions for a wide range of exciting applications such as:

- passenger health monitoring to avoid diversions by communicating directly with a doctor on the ground and providing real-time the patient's vital statistics or even video conferencing;
- customer service applications such as passenger re-accommodation in-flight when delays occur;
- electronic flight-bag updates;
- online real-time crew annuals;
- real-time engine monitoring – not just snapshots or major fault reporting but true real-time monitoring;
- real-time and graphic-intensive weather reports to improve safety and delays;
- black box data offload.

The speaker will tickle the imagination of the audience with the monumental positive impact that real-time, broadband, global, affordable aircraft communications will have on the entire aviation industry.

Airports: closing the gap on process capability

Chris Garton

Operations, Dubai Airports

1. Theme

Customer feedback identifies good airports. There are also bad airports. There are few great airports. And the good airports have good days and bad days, the good days have good hours and bad hours... This leaves the customer dissatisfied and frustrated that simple requirements such as leaving on time with baggage are not met ... yet the same customer with almost any other service provider gets the quality they want right the first time almost every time. There is a lack of process capability in airports.

2. Strategic framework

The presentation sets out the aviation industry's two main barriers to achieving customer satisfaction:

- a) An *inefficient industry model* which is hamstrung by protectionism, taxation and a punitive regulatory environment, all of which suppress industry growth and profitability.
- b) An *inefficient operational model* in which silos have carved up the travel experience with the passenger bumping between the joins between stakeholders... shortfalls that are most visible in the airport environment where all parties come together. Airport environments worldwide are vertical when they should be horizontal, fractured when they should be integrated and myopic and inwardly focussed when they should be customer-centric.

Complicating matters is the fact that human nature/self-interest, organizational rigidity and legacy systems have created an environment where change is difficult to implement.

3. Dubai's response

Dubai has to some extent solved the first issue and is now working actively on the second to transform the operational model.

Dubai's industry model features a liberalized, open-skies regime, tax-free environment, government support and investment and a collaborative approach...all of which have been constructed as part of an economic diversification strategy which extracts the socio-economic value of aviation and supports tourism, trade and commerce throughout the Emirate.

While there are inherent advantages to a more collaborative and supportive framework it does not eliminate the issues. The driving forces for change are similar – customers want control of their time, predictability and certainty of experience, efficiency, comfort, price and convenience. Efficiency gains have been made often through the application of technology and usually with a customer benefit attached.

4. Paradigm shift required in the industry

The customers who use our airports are the same customers who buy mobile 'phones, cars, pharmaceuticals, etc. They expect their purchase to work first time with no surprises and to improve their experience. Typical manufacturers achieve less than 3 *per* million defects to customer satisfaction. The best airport mishandles 1 bag in every 1000 shipped or 1000 bags *per* million. No wonder the customers are not happy!

Airports are continuous process enterprises not altogether unlike an oil refinery or car factory. Yet we don't approach it with the same rigour. There should be stringent process quality across horizontally integrated processes and systems with the customer requirement at the epicentre. Focus should be on quality assurance – control the inputs and the process to guarantee the output ... rather than rely on inspection. You can't control what you don't measure and this should include real-time, shared data on integrated systems. The target for our quality assured systems should be the customer requirement and not the historic industry norm. We need to adopt an approach where there is predictable sales and operations planning to run the whole supply chain to meet customer demand exactly.

5. Fixes underway

The presentation outlines industry progress in this area, citing examples from organizations such as IATA who seek the standardization of industry processes and regulation and the application of the appropriate technologies as key drivers of efficiency.

It also informs about specific initiatives underway at Dubai International Airport, where we are taking advantage of our collaborative structure to expedite to the extent possible progress in all areas.

Dubai Duty Free

George Horan

Dubai Duty Free

Abstract of speech

Non-aeronautical revenues continue to be an important component to airports in the region, as is the case world-wide. On average, 47.5% of total airport revenues world-wide comes from this source though this percentage varies widely from airport to airport. The presentation will touch upon the important types of non-aeronautical revenues, such as duty free retail, food and beverage, car-parking, advertising, fuel concessions, currency exchange, and other retail activities such as car-rentals and hotel kiosks.

The presentation will then focus on duty free retail which continues to be the biggest component of non-aeronautical revenue in Dubai and elsewhere. The importance of duty free retail revenues to Dubai Airport was also recently emphasized by the funding of Dubai Airport's SP2020 expansion plans through the USD 1.75 billion loan raised by Dubai Duty Free for this purpose.

Using Dubai Duty Free as the case study, the presentation will then highlight the importance of passenger flow, design, fit-out, service and merchandise in maximizing the duty free retail component of non-aeronautical revenue. The presentation will conclude with the projections of future growth of Dubai Duty Free until the year 2020.

Journey of the UAE General Civil Aviation Authority in safety management

Omar Bin Ghaleb

UAE General Civil Aviation Authority

Text of speech

Good morning, Ladies and Gentlemen!

It is a great honour for me to be invited to the First International Aviation Management Conference to trace with you the journey of UAE General Civil Aviation Authority (GCAA) in Safety Management.

Safety has constantly been our top priority. At GCAA, we are committed to developing, implementing, maintaining and persistently improving strategies and processes to ensure that all our aviation activities take place under an effective organization and culture required to achieve acceptable levels of safety performance by the service providers. It is well recognized that the future of aviation safety cannot rely exclusively on regulatory compliance. Regulators globally will need to complement a prescriptive-based approach with a performance-based approach.

ICAO requires each member-state to establish *State Safety Program* (SSP) which includes four major components: the development of safety policy, risk management, safety assurance and safety promotions.

Our journey for SSP commenced successfully with the launching of Reporting of Safety Incidents (ROSI) in January 2010. It was followed by circulation of regulations and standards requiring the implementation of the Safety Management System (SMS) by the service providers. Following this event, GCAA established a State Safety Policy (SSP) and underwent an organizational transformation process in 2011 in order to align with a modern aviation system that can ensure safety of the air transportation system.

Today, SMS is a global standard for managing safety proactively. It requires a proactive safety culture within GCAA and the aviation industry that needs to work in partnership to reduce the likelihood of accidents. I must emphasize that a culture must exist where each and every stakeholder assumes responsibility for aviation safety.

The ideal safety culture is one that is supportive of the staff and systems recognizing errors will be made, but non-punitive reporting shall always be encouraged to promote safety.

Cultural change must begin at the top level of the organization, where authority, leadership and ultimate accountability exists.

Participation of all stakeholders in safety performance represents a major cultural shift. The nature and objectives of these changes must be clearly understood if the SMS is to be successful. Under the SMS, the integration of a formal risk management system must go beyond analysis of hazard, incident and accident reports.

Besides our efforts to ensure full implementation of SMS, we have made significant progress towards implementing the remaining part of the SSP. I would like to give an example here. GCAA has currently established the State Aviation Enforcement Standards. This will encourage our service providers to introduce a non-punitive reporting system. In 2013, one of the important initiatives we will be undertaking as part of safety assurance is risk-based safety oversight activities. This approach will ensure that resources are used where appropriate and oversight activities are essential. Recently, we initiated workshops to guide the service providers in setting up their safety indications and safety targets aiming to achieve acceptable level of safety performance by December 2012. GCAA and its stakeholders will focus on performance-based safety issues and provide genuine improvement in its performance.

Our challenges are many and diversified, but we are not without allies. Our national carriers and international safety and security partners have been of great assistance to the GCAA in developing, planning and implementing strategies that reflect the regional requirements in terms of managing our airspace and safe handling of traffic on the ground.

We are well on our way to ensure a safe, secure and environmentally-friendly air-transportation system that will support fast aviation growth in the region.

Today, the aviation industry has risen to the challenges to make the business of flying safer than ever before and deserving of the trust of the travelling public in the UAE. I am proud of what we have achieved in partnership with the aviation industry.

I thank you for engaging me to talk at this conference.

I am sure we will build a stronger partnership for safety and security through your active participation in this conference.

My best wishes to you all for a safe journey in the coming years.

Thank you for your attention.

Delegates' papers

An insight into Emirates Airline’s strategies and an analysis of how it is helping the company to sustain a competitive advantage over its rivals

Sahar Gamal Taher Abdellatif

Emirates Aviation College, Dubai, UAE

Abstract: In a competitive airline market, a strategy is required for the company to gain, as efficiently as possible, a sustainable edge over its competitors. In this paper, the author will explore the strategies adopted by Emirates to strengthen its position relative to that of its competitors, through studying Ohmae’s strategic options.

Keywords: strategies, competitive advantage.

1. Introduction

This paper explores four different business strategies that Emirates Airline adopts to sustain a competitive position to its rivals. The first strategy is based on key factors for success. The second strategy is based on relative superiority. The third strategy is based on strategic degrees of freedom. The fourth strategy is based on aggressive initiatives.

2. Research approach

A research method can either be inductive or deductive. The inductive approach goes from specific to general and involves an analysis and collection of existing data, facts, information and/or examples and reaching conclusions/arguments. This approach was used in this paper by collecting information, from relevant books and websites, about the business strategies of Emirates airline, analysing it using the Ohmae business strategies model, and drawing conclusions and making generalizations about the airline’s success.

3. Emirates Airline’s strategies

The author will analyse and identify Emirates Airline’s strategies following Ohmae’s strategies model as follows:

3.1 Ohmae strategies for a company to strengthen its position relative to that of its competitors

Ohmae (1982, pp.36-37) stated that “What business strategy is all about what distinguishes it from all other business planning is, in a word, competitive advantage. Without competition, there will be no need for strategy, for the sole purpose of strategic planning is to enable the company to gain, as efficiently as possible, a sustainable edge over its competitors”. Ohmae continues, “Corporate strategy thus implies an attempt to alter a company’s strength relative to that of its competitors in the most efficient way”. Ohmae (1982, p.38) posits that “there are four ways to strengthen a company’s position relative to that of its competitors”; these are listed as follows:

Business Strategy based on key factors for success: “A company might readjust the allocation of the resources at management’s disposal” (Ohmae 1982, p.39). The point in this method is to

identify the key factors for success in the industry or the business concerned and then to inject a concentration of resources into a particular area where the company sees an opportunity to gain the most significant strategic advantage over its competitors' (Ohmae 1982, p.39).

Business strategy based on relative superiority: "Among companies competing within the same industry or business, there are cases in which, even though the company enjoys no initial advantages over its competitors and the key factor for success struggle is being waged with equal vigour by all the companies concerned, a relative advantage can be still achieved by exploiting any difference in competitive conditions between the company and its rivals" (Ohmae 1982, p.39).

Business strategy based on aggressive initiatives: "It is an unconventional strategy that aims at upsetting the key factors for success on which the competitor has built an advantage" (Ohmae 1982, pp.39,40).

Business strategy based on strategic degrees of freedom: "Even in the case of intense competition within the same industry or business, success in the competitive struggle can be achieved by the deployment of innovations" (Ohmae 1982, p.40). "These innovations may involve the opening up of new markets or the development of new products" (Ohmae 1982, p.40).

3.2 Emirates Airline's strategies to strengthen its position relative to its competitors

In the opinion of the author, Emirates gained significant ground relative to competitors by following all four of the Ohmae ways of strategic options. This is to be explained as follows:

3.2.1 Emirates' business strategy based on key factors for success

In a personal interview conducted with the author, Jori Bindels, Emirates Manager of Corporate Communications and a senior person in Emirates' Commercial Operation Department, stated that "Emirates follows the business strategy based on key factors for success, in which it could add frequencies to popular destinations if the airline will obtain good revenue from this add-on, and if the bilateral agreement allows Emirates to increase its frequency into the destination". The manager continued, "For example, Emirates sometimes increases the frequency to a popular destination during high seasons, such as increasing the frequency of Jeddah flights during the Hajj season, and increasing the frequency of flights to China during the Chinese New Year season" (Bindels 2012).

The author maintains that by Emirates adopting the business strategy based on key factors of success, Emirates increases opportunities in popular destinations and high season demands; which has most likely helped the company to gain a strategic advantage over its competitors.

3.2.2 Emirates' business strategy based on relative superiority

Shaw (2004, p.103) proposes that Emirates is successful in the differentiation sector and is sustaining a competitive advantage over its competitors. This is due to Emirates applying the following strategies:

First mover advantage: Shaw (2004, p.103) suggests that Emirates Airline is keen to secure the "first mover advantage" in the areas of cabin comfort, in-flight service and in-flight entertainment, in that they continue to reap the benefits of innovation even after the competitors have imitated it.

Emirates' presence in major market segments of leisure, business and freight: Emirates airline has a synergistic presence in all of the important segments of leisure, business and air freight. This strategy provides Emirates with the highest yields through its presence in the business sector, the highest growth rates through its presence in the economy sector, and cash flow through the freight sector. Those sectors have complementary demand patterns (Shaw 2004).

Large route network: Emirates has a rapidly growing route network and it is the only airline in the world that offers non-stop service to over 110 destinations across six continents from one hub and allows passengers to have “online” rather than a “transfer” connection on its own large network, as Emirates has services to most of the destinations to which a passenger would need to travel (Emirates 2011). This strategy makes Emirates superior to its competitors; all surveys of passengers' preferences show that they prefer to have a direct flight, and on-line connections to the transfer ones (Shaw 2004, p.105).

A strong frequent flyer programme (Skywards): Many travellers prefer to use Emirates to its competitors because of the strength of its frequent-flyer programme “Skywards”, which has “consistently demonstrated success in award recognition at the annual Freddie Awards (the 'Oscars' of customer loyalty programmes) in the last three years, as well as previously, for Best Member Communications, Best Customer Service, and Best Award Redemption” (Emirates 2011).

“Hub and Spoke” strategy: The author notes that Emirates has based its strategies for success, under deregulation and open skies, on the “hub and spoke” strategy, where it serves a big number of destinations from one airport at high frequencies, and where it allows passengers to connect from/to the East to/from the West *via* the Dubai hub. This strategy offers an attractive schedule to its passengers, gives Emirates protection against the attacks of the competitors, and provides it with a competitive edge over its rivals (Shaw 2004, p.57).

Complimentary stopover/transit visa: The Dubai immigration law states that transit passengers do not have to clear immigration, at the Dubai airport when changing planes. Emirates uses this advantage and offers complimentary visa and hotel accommodation whilst in transit. This greatly improves Emirates' competitive position on some routes.

Clever and strong marketing strategy: Emirates succeeded in building a unique, clever and strong marketing communication mix that concentrates mainly on advertising and sponsorship. The sponsorships delivered fast brand-awareness around the globe; advertising succeeded in turning that into sales (Pilling 2006).

3.2.3 Emirates' business Strategy based on strategic degrees of freedom

Emirates adopts the business strategy based on strategic degrees of freedom, in which it is innovative in all aspects. Emirates Airline is keen to secure the “first mover advantage”, in the areas of cabin comfort, in-flight service and in-flight entertainment, in that it continued to reap the benefits of innovation even after the competitors have imitated it (Shaw 2004, p.103).

3.2.4 Emirates' business strategy based on aggressive initiatives

The author maintains that Emirates follows the business strategy based on aggressive initiatives, as it upsets the competitors as a result of capturing market share by introducing superior product and connectivity.

4. Conclusion

Emirates gained significant ground relative to competitors by following all four of the Ohmae ways of strategic options, which are the business strategy based on strategic degrees of freedom, the business strategy based on aggressive initiatives, the business strategy based on relative superiority, and the business strategy based on key factors for success.

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Protectionism in aviation and means to bypass it: the case of Emirates Airline in Canada

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Abstract: This paper starts by introducing the principles of ‘free trade’ and ‘protectionism’ in general and in the airline industry in particular. Subsequently, this document narrows to a current protectionism issue within the airline industry: the case of Emirates Airline being denied more landing rights at Canadian airports. Following that, the paper presents an analysis of key facts and figures pertinent to the aforementioned case. Based on this analysis, it mainly posits that protectionist actions undertaken by a nation against a particular foreign airline might not necessarily serve their purpose and could possibly have a negative impact on that nation’s economy.

Keywords: free trade, protectionism, Emirates Airline, Canada.

1. Introduction: free trade and protectionism

The integration of goods, services, people and knowledge is at the heart of the globalization process, and ‘free trade’ appears to be one of the key drivers of this integration. According to the World Trade Organisation, free trade implies that nations should treat both foreign and national firms in similar manners, and governments should refrain from favouring local organizations against foreign ones (WTO 1995). In other words, countries should substantially reduce tariffs and barriers to trade and must eliminate any forms of discriminatory treatments in their international trade activities. To abide by the principles of free trade, an increasing number of WTO members are no longer engaging in activities that protect their industries from foreign competition. This has helped liberalizing markets and assisted many companies in expanding globally.

Nonetheless, while more and more governments are encouraging free trade different forms of protectionism remain common practices in many countries. The main argument that such nations are making is that they need to protect domestic jobs and prime local companies against unfair competition that is a result of price dumping, environmental and social dumping, and/or direct foreign governments’ subsidies (Voon, 2010). The most common aspects of protectionism encompass tariffs on imported goods and services, as well as Non-Tariff Barriers (NTB) mainly in the form of quotas and policies that limit import (*Ehrlich, 2007*).

Amongst the sectors that are still subject to protectionism the airline industry is perhaps the one that is suffering most. In effect, very few flights can depart or arrive without a bilateral agreement between the two concerned nations – agreements that often place barriers on numbers of flights and/or particular arrival/departure cities. Consequently, while most industries are benefiting from an increasingly liberalized economy, the airline sector remains highly regulated and extensively protected. This is fairly surprising knowing that most nations around the globe have claimed to support the ‘Open Skies’ agreement (a policy that advocate the liberalization of regulations in the international aviation industry). The ‘Open Skies’ agreement (particularly the ‘third freedom’ and ‘fourth freedom’) clearly indicate that no restrictions should be placed on international carriers’ rights for increasing their frequencies, capacity, routes and for choosing the types of aircraft they seek to service these routes. The following section presents one

example in which ‘Open Skies’ concepts do not seem to be respected: the case of Emirates Airline and the Canadian government.

2. Protectionism in aviation: the case of Emirates and Air Canada

In 2007, the Dubai flagship carrier ‘Emirates Airline’ deposited a request to the Canadian government – through the United Arab Emirates (UAE) government – asking for more landing rights at Canadian airports. In particular, Emirates wanted to increase its current quota of three flights *per* week to Pearson International in Toronto to daily services to Toronto, Calgary and Vancouver airports. After intense negotiations that lasted for nearly three years, the Canadian government finally decided to maintain the current quota (of three flights per week to Pearson International). Canada claimed that more landing rights will result in ‘capacity dumping’ and unfair competition with its prime airline ‘Air Canada’.

The Canadian government strongly justified and supported its stand by pointing that Emirates is an international carrier that is directly subsidized (even yet owned) by the Dubai government. Such action in particular, seems to aim at protecting Air Canada from unjust competition on routes to the Middle East and South-East Asia. Interestingly, however, the Canadian airline does not fly to these markets and does not retain other airlines (such as Lufthansa, British Airways, KLM, Air France and Cathay Pacific) that fly from/to Canadian airports to connect customers from their hubs to South-East Asia and some cities in the Middle East. In parallel, Emirates Airline represents one of the fastest-growing corporations in the UAE and has received more than 400 global awards for service excellence in linking Asia to Europe and the Americas (e.g., 2011 Top North American Club Lounge; 2010 World’s Best Airline Inflight Entertainment; 2009 Best Airline; 2009 Best First Class; 2008 Best Global Airline Website). Moreover, Emirates has fiercely denied any accusations of it being engaged in any form of unfair governmental support. As well, in 2009, the Canadian government has poured more than CAD 250 million from Canadian tax-payers money to support Air Canada which was then at the verge of bankruptcy. Therefore, supporters of Emirates’ request ‘for more landing rights into Canada’ could counter-argue that the Canadian government decision is violating the principles of ‘Open Skies’ and its real aim is to protect a weak national carrier against a highly successful international one.

While the above paragraphs could open the door to an interesting and nurturing debate, the focus of this paper is on the means through which Emirates Airline could bypass the protectionist action taken by the Canadian government by benefiting from its current expansion into the United States. The subsequent section will elaborate on this issue through an analysis of key figures pertinent to this matter.

3. How can Emirates bypass the Canadian landing rights quota?

Following Canada’s rejection of Emirates’ additional flights request, the UAE government has continuously attempted to appeal the Canadian decision and has taken measures (e.g., removing the visa waiver programme for Canadian citizens and denying Canadian military jets from utilizing UAE air force bases) in the hope of pressuring Canada to rethink its verdict.

Nonetheless, this hope seems to be fading as the Canadian government appears to be holding strongly to its decision. Interestingly, Emirates Airline might not have to put on hold its strategy of boarding more passengers from Canada to Asia and the Middle East, despite the current constraint placed by Canada.

In particular, an examination of Emirates’ current and prospective expansion strategy into the U.S. reveals an opportunity to target both American and Canadian passengers who seek to fly

from their countries to Dubai, its neighbouring nations or beyond to major Asian cities. In order to support this suggested strategy let us first examine Emirates' current routes to the United States.

As exhibited in Table 1, as of 1 March 2012, the Dubai flagship carrier is conducting at least one flight *per* day to main U.S. hubs (such as San Francisco, Dallas, New York and Seattle) – primarily using its fleet of Boeing 777-300 ER aircraft and one of its Airbus A380 (to New York). Furthermore, as Emirates' Chief Executive Officer Tim Clark has indicated, Emirates upcoming tactic is that the 'A380 would do most of the U.S. operations'. If such an action is taken by Emirates, this would eventually increase the passenger capacity which is currently offered to U.S. cities, from an average of 360 seats *per* flight to almost 500 seats *per* flight.

Table 1. Emirates Airline flights to the U.S. (source: Emirates Airline website).

From/to	San Francisco (aircraft type)	Los Angeles (aircraft type)	New York (aircraft type)	Houston (aircraft type)	Dallas (aircraft type)	Seattle (aircraft type)
Dubai	1 flight/day (Boeing 777-300 ER)	2 flights/day (2 Boeing 777-300 ER)	2 flights/day (1 Boeing 777-300 ER; 1 Airbus A380)	2 flights/day (2 Boeing 777-300 ER)	1 flight/day (Boeing 777-300 ER)	1 flight/day (Boeing 777-300 ER)

In addition to the aforementioned current destinations and number of flights, Emirates has indicated that it seeks to further expand its presence in the U.S. by analysing the possibilities of servicing international airports in Boston, Chicago, Detroit, Philadelphia and Washington, DC.

Moreover, by investigating the flight durations between the current and potential airports that Emirates is or is seeking to serve in the U.S. and major Canadian hubs, it could be noticed that Canadian passengers who seek to board an Emirates flight from the United States can do so through very short flights from their home town airports. For example, the flight duration between Detroit and Toronto is 25 minutes, New York and Montreal is 50 minutes, Seattle and Calgary is 50 minutes and, Seattle and Vancouver is less than 20 minutes. It is worth remembering here that most of these routes are being extensively serviced (sometimes on an hourly or bi-hourly basis) by U.S. carriers (such as American Airlines and Delta). Furthermore, while a more accurate examination is still required, it appears from a preliminary study of Emirates Airline's actual fares (from its current U.S. destinations to Middle Eastern and Asian hubs) that the Dubai carrier has succeeded in offering prices that are comparable with most large carriers operating on these routes. These prices could even become highly competitive should Emirates pursue its objective of servicing most U.S. routes using its new A380 aircraft.

Accordingly, based on the above facts it seems reasonable to argue that, irrespective of the protectionist quota being placed on Emirates' flights to Canada, the airline could potentially follow a strategy by which it could attract a considerable number of Canadian passengers who seek to travel from Canada to the Middle East or Asia. In effect, Emirates could, through an alliance or partnership with a major U.S. carrier, transport Canadian travellers from their home town airports (onboard the U.S. based airline) to a nearby American city and then board them on

Emirates flights to Asia and the Middle East. Hence, Canadian passengers, who currently have limited access to the high quality service of Emirates, could then choose the Dubai carrier for their Middle Eastern and Asian destinations *via* a short-duration flight to the U.S.

4. Conclusion

The above analysis indicates that Emirates Airline can bypass the protectionist action taken against it by the Canadian government by benefiting from the ‘Open Skies’ accord that the UAE has with the United States (a country bordering Canada). Accordingly, this paper mainly posits that protectionist actions taken by a certain nation against a particular international airline could be circumvented if the country neighbouring that nation has signed a bilateral ‘Open Skies’ agreement with the international carrier’s home country.

In conclusion, since 2004, when Emirates inaugurated its first flight to JFK New York, the total value of trade between the U.S. and the UAE has nearly tripled and has reached more than USD 15 billion. On the other hand, based on the output of a research conducted by InterVISTAS Consulting, more than 2800 jobs and USD 480 million in benefits can be brought to Canada, should Emirates’ quota be expanded (Emirates Airline 2010). Moreover, Canada’s action has resulted in the UAE government placing restrictions on several Canadian firms trading with the United Arab Emirates (note that the UAE was the 17th largest export market for Canada) (Taber 2011). Therefore, if the future supports this paper’s argument, one could state that protectionism in aviation might not be a sound economic decision towards the nation that is carrying it. Indeed, a country placing quotas on landing rights could not only be ineffective in protecting its national airline against competition but could also undergo substantial economic losses.

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Rethinking the business model of low cost airlines: a review of Ryanair

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Abstract: The aim of this paper is to evaluate the performance of a low cost airline depending on its profitability with an overview of Ryanair's success/failure. The topic is significant to both academics and practitioners to provide a better understanding of the airline industry in coping with the unstable situation. The study focuses on the impact of internal and external factors on the strategic growth of Ryanair. The research is based on quantitative and qualitative research of passengers' satisfaction with Ryanair. This paper sets the scene for low cost airline issues, which make significant contributions towards our understanding of their business in this difficult climate. The results of the study reveal that the recession has had an impact on the UK airlines sector due to the unstable fuel prices in the UK and across the world.

Keywords: low-cost airlines, sustainability, recession, passenger satisfaction, Ryanair.

1. Introduction

The aviation industry has gone through major changes since the beginning of this century, especially when the aviation industry introduced the Low Cost Airlines (Carriers) (LCAs). Laker Airways could be considered as the first low-cost airline, which was founded by Sir Freddie Laker in 1966. It was a wholly private, British independent airline, originally a charter airline flying passengers and cargo worldwide. Its head office was located at London Gatwick Airport in Crawley, England (Flight International, 1981). The business design of these low cost airlines is simple with one particular kind of aircraft, certain routes, and one kind of passenger class, no airport lounges, no frequent-flyer programmes, no connecting flights and no refunds (Calder, 2002; Doganis, 2009). Using one type of aircraft leads to high utilization, charge for all extras e.g. refreshments, baggage and priority boarding. Also, the usage of one type of aircraft helps in lowering training costs of both crew and engineers.

This paper will consider some of the roles which regional and low-cost airlines can fulfil and address the challenges they face (Appelbaum & Fewster, 2004). Taking into account the number of significant events and developments that have occurred over the last decade, including the financial and credit crunch in 2008, which led to the overall reduction in demand for air travel throughout North America, organizational changes in the aviation industry included the emergence of low-cost airlines, and the bankruptcy of a few airlines across the world. Some of the Asian airlines have, however, performed exceptionally well due to the market conditions. The above events have certainly shaped and influenced the airlines and their operations in recent years. A thorough and a comprehensive study of these has highlighted a variety of facts and figures to help us in understanding the nature of the business at this point of time, when the economies are showing slow recoveries and back on track. The casualty numbers are, however, quite high and are in different forms.

2. Literature review

In recent years, there have been a number of changes in the global airlines industry which have had profound effects on the development of this volatile sector of the economy in most countries worldwide (Jiang, 2007; Holloway, 2008). In Europe, many regional airlines have been engaged in upgrading their fleets, such as Ryanair, easyJet, British Airways, etc., and are hence expected to play a vital role in its transportation networks.

The low cost airlines are now focussing on improving the service quality and image by communicating its features to passengers. This can be achieved with the right marketing strategy that incorporates elements such as customer-orientation, integrated marketing efforts and the resultant company profitability and customer satisfaction.

In this process, continuous relationship between airlines and their customers has become a key issue within the airline industry standard (O'Connell & Williams, 2005). Kotler *et al.* (2009) stated that market segmentation is the separation of customers into groups with similar needs and wants, e.g., business and leisure (Parliamentary Office of Science and Technology, 2000). According to Doganis (2005), the rise of LCA was possible due to the liberation of the EU in 1993. Also, in addition to Laker Airways, Hanlon (2006) stated that the low-cost airline was brought to Europe by Ryanair in 1991, and was capitalized upon in the USA by Southwest Airlines in 1971. With the advent of this 'low-cost revolution', as coined by Doganis (2001), the traditional airline companies had no choice but to respond to this new entrant. In recent years and despite the above, low-cost airlines, together with regional carriers using small aircraft, have been growing fast, and in particular Ryanair.

Michael O'Leary (Ryanair's CEO) announced that Ryanair is Europe's largest low-cost airline with a 26% increase in annual profits to EUR 401m (GBP 318m), revenues increased 21% to EUR 3,630m (GBP 2,881m) as traffic grew 8% and average fares rose 12% (see Table 1).

Table 1. Summary of Results by the *International Financial Reporting Standards (IFRS)*

Year End	31 March 2010	31 March 2011	% Change
Passengers	66.5m	72.1m	+8%
Revenue	EUR 2,988m	EUR 3,630m	+21%
Adjusted Profit after Tax	EUR 319m	EUR 401m	+26%

Source: Ryanair.com (2011)

The figures in Table 1 highlight the success of Ryanair, including profits rose 26% to EUR 401m, traffic grew by 8% to 72m passengers, 40 new aircraft (y/e fleet 272 aircraft), 8 new bases, e.g., El Prat, Gran Canaria, Kaunas, Lanzarote, Malta, Seville, Tenerife, Valencia (total 44 bases), 328 new routes (total over 1,300 routes), and dividend of EUR 500m (EUR 846m returned to shareholders over a 3 years period). Purchasing tickets is made on the basis of desirable product features or on the basis of price, and not on the basis of unit cost itself. Mintzberg (1991) and Graham (2008) argued that the price, along with image, support, quality and design can be used as the basis of differentiation. Prousaloglou & Koppelman (1999) point out that when passengers choose a flight, they try to maximize their "air travel utility". According to them, elements like the market presence, quality of service, frequent flyer membership, fare levels, travel restriction and schedule convenience, determine the choice of passengers.

3. Critical success factors of Ryanair

Critical Success Factors (CSFs) is an area in which an organization must outperform its competitors. In other words, they are the product features that are particularly valued by a group of customers. CSFs in Ryanair include, innovation, low-fare tickets, punctuality, Ryanair's website, resources (financial, physical and human resources, senior management team (e.g., Michel O'Leary was appointed as the Chief Executive Officer in 1994 and has been a Director since November 1988).

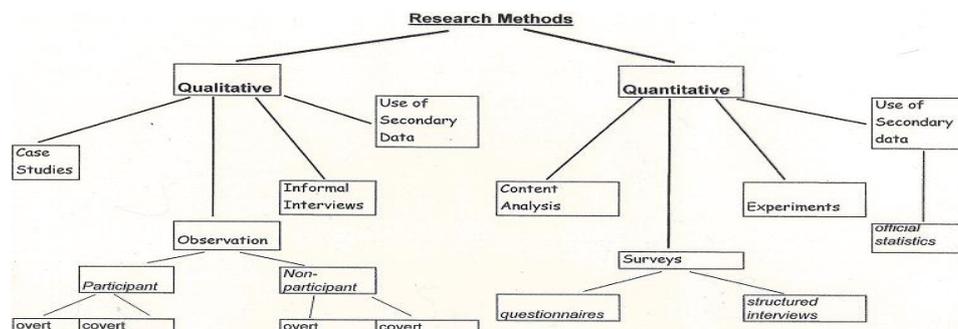
The two research questions this paper addresses are as follows:

- What is the extent of sustainability of low-cost competitive strategies designed for Ryanair?
- What are the resources and capabilities of Ryanair that allow it to be a leading LCA and survive the current aviation turmoil?

4. Research methodology

4.1 Methodology

Research methodology is known to be the methods and procedures used to conduct the study, including the collection and analysis of data (Kervin, 1999; Sunders *et al.*, 2012). It can involve specific instruments, such as a self-completion questionnaire or a structured interview, or a participant observation (Bryman & Bell, 2011). Figure 1 shows in detail the main methods (quantitative and qualitative) that could be used in the research approaches, including the specific instruments and both quantitative and qualitative methods, e.g., content analysis, experiments, case studies, interviews, etc.



Source: Hayes (2005)

Figure 1. Types of Research Method

4.2 The research context

A mixed approach of quantitative and qualitative, with emphasis on quantitative, analysis has been used in this study (Hayes, 2005). A survey is carried out to gain a deeper understanding of the problem. The interview conducted with the personnel at Ryanair adapts the qualitative research method. The research investigates the impact of internal and external factors on the strategic growth of the company (Bryman & Bell, 2011). Also, the paper aims at providing insights into the development of the organization and key competitive strategies adopted by Ryanair for its sustainability. Both primary and secondary research data have been used in the study.

4.3 Primary data collection

Both quantitative and qualitative methods are used to collect the primary data. To conduct a quantitative analysis, a self-completion questionnaire was designed, which includes 24 questions to provide answers to the problem and to help defining a relationship between various variables (Kervin, 1999). The questionnaire method is widely used when the data need to be analysed quantitatively. The questionnaires used include closed-ended questions. The open-ended questions were mainly aimed at getting an insight into the marketing strategy and their opinion of the market. This was mainly used in the interview section. The questionnaire was distributed to the passengers who had travelled on Ryanair in the past. The sample has been selected by a convenience sampling method. The sample size consists of a total of 75 passengers selected at random at Luton airport. Only 50 responded to the questionnaire. The sample used to judge the real experiences of passengers. Also, passengers of different age groups were selected for the survey to balance the research and to avoid the risk of gathering experiences of different passengers from a certain age group. Appointments for interview with managers at Ryanair were arranged *via* personal contacts. The identity of the respondents at Ryanair will be anonymous. The interview with officials from Ryanair, were communicated by e-mail due to a limitation of resources, to increase response rate and speed up the process.

4.4 Analysis, findings and results

The interpretation of the findings of the primary research will begin with the explanation and findings of the interview conducted with a corporate manager at Ryanair. The second part will be the findings from questionnaires conducted with customers of Ryanair; questions include the variables of satisfaction, preferences, and feelings towards Ryanair customer services, its time management and the low-cost business model the airline uses.

Interview findings

A semi-structured interview was conducted with the manager of Ryanair. The interview duration was 20 minutes. The interview was conducted in a professional manner and questions were designed to explore the impacts on Ryanair's policies and operations with regards to the recession in the UK. The interviewee's identity could not be disclosed and confidentiality was assured as it is a company policy at Ryanair for employees not to take part in any form of research (Bloor *et al.*, 2000). The interviewees were asked five questions to explore the impact of recession on airlines. The questions also have included marketing strategies and costs to investigate the change adapted by Ryanair. According to different subjects the questions are grouped into two areas, *viz.*, operational changes at Ryanair and the impact of recession on the airline. Talking about their online ticket booking and exploring different types of channels for either advertising or attracting customers, the manager highlighted the importance of technology to Ryanair. At Ryanair the booking system is very simple and cost effective. The customers can only book tickets online through the airline's website. Marketing is done using similar channels. The manager commented on their online booking policy and the use of different channels as follows:

“As far as exploring more channels is concerned, right now the online booking method is the best option for us and for our customers. As the technology progresses and has more to offer we will definitely be ready to embrace it.”

4.5 Impact of recession

Rising fuel prices are a big concern for any airline. It is one of the major obstacles which are faced by low cost airlines such as Ryanair, where keeping fares low is the top priority. The credit crunch resulted in tightened lending conditions, as consumers cutting back on unnecessary spending, i.e., leisure travel which constitutes a major part of low cost carriers. According to the interviewee, Ryanair is faced with tough times as the whole world of business is still experiencing the credit crunch. Nevertheless, the passenger growth for Ryanair has been maintained regardless of profits. The interviewee suggested:

“Rise in fuel prices had put extreme pressure on costs. But we have always been committed to our customers first and therefore we are ready to sacrifice on our earnings but not on our customers.”

According to many analysts, despite the economic slowdown, consumers had not stopped travelling for leisure and the crunch had never really hit the low cost carriers. Table 2 shows the results of the survey: the value of χ -square is 9.011, cumulative frequency (P) is 0.061 and the number of degrees of freedom is 4. As the cumulative frequency is greater than the significance level (0.05), it may be assumed that there is a continuous improvement in the services offered by Ryanair.

Table 2. Cross Tab: Value for Money and Quality of Service Offered

	Value	Degree of freedom	Asymp. Sig. (2-sided)
Pearson χ -square	9.011	4	.061
Likelihood Ratio	10.077	4	.039
No. of Valid Cases	50		

5. Questionnaire analysis

Some of the sample information is taken into account, so as to decide which demographic groups are most represented in the sample and to provide a balanced analysis.

Table 3 shows information on passengers from which the consumers' perception of the airline market could be assessed and measured. The first question looks at the different age group of passengers. The major consumers group is between 18-25 years old which accounts for 42% of the total number, whereas the second is between 26-35 years old which accounts for 26%, and the third is the group of 36-55 years old which is 14%.

6. Conclusions and reflection

This study highlights factors that affect the sustainability of Low Cost Airlines and in particular Ryanair. The results of this study reveal that the recession which has had an impact on the UK economy, led to a significant impact on the aviation industry. This is due to many reasons and in particular the instability of fuel prices. Even though the earnings of Ryanair were affected by the economic downturn, it has still tried its best to retain its 'lowest fares' strategy.

Table 3. Age Group

Age Groups	Frequency	Percentage	Cumulative Percent (%)
18-25 year old	21	42	42
26-35 year old	13	26	68
36-55 year old	7	14	82
56-65 year old	5	10	92
Above 65 year old	4	8	100
Total	50	100	

The airline managed this due to cutbacks, a gradual recovery in fuel prices and earnings from ancillary revenue. With a low-cost strategy being an apparent strength of Ryanair it is able to achieve optimal utilization of time in the air. This performance reflects the growth of on-board sales, non-flight scheduled revenue, and other ancillary products (Ryanair 2009a,b,c). This research has shown that Ryanair has gained enormously from the 'first mover advantage'. Simple logistics as its main focus on secondary airports, not only allows it to minimize landing and ground handling fees, but also takes it away from the direct competition with easyJet, Airberlin. In addition, this research shows that online bookings from its website (Ryanair, 2009a) have accounted for 94% of the total bookings and have also lowered the cost of distribution.

On the same lines, the company has adopted a new policy of online check-in, but the survey has revealed that passengers are unhappy with this procedure, as it proves to be exorbitant. Online check-in costs GBP 5 each way, and for an emergency check-in at the airport, it will cost GBP 40 each way, while its competitors, easyJet and Airberlin, still maintain their check-in desks. Furthermore, it has slashed prices and increased rates for non-ticket items like luggage, and is set to further increase it by 50%. The airline's ballpark figure to save is EUR 50 million (GBP 42m) on airport counter staff and ground-handling costs. Ryanair made almost GBP 550m last year in extra charges such as baggage fees, in-flight food and insurance costs. It is the fourth most profitable airline in the world when it comes to the money that it makes from "ancillary revenue" and the most profitable in Europe, as stated in the report by the research group IdeaWorks (Elliott, 2008).

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Appendices will provided on request to the corresponding author

Financial perspectives of TAP Air Portugal using DuPont analysis

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Abstract: This paper focuses on SWOT and Return on Equity (ROE) analyses of the Portuguese flagship company (TAP Air Portugal). Based on the extended DuPont analysis methodology, and using the 2009 consolidated financial reports as input data, the financial ratios of the company are calculated and compared to industry average and competitors, such as Lufthansa and easyJet. The paper contributes to the discussion of the effects in return on investment and leverage of investing and financing decisions and corporate income taxation. Key issues on the return-risk trade-off, are addressed and become highly relevant given the imminent privatization of the airline.

Keywords: TAP Air Portugal, ROE, extended DuPont analysis, Lufthansa, easyJet.

1. Introduction

The information provided in the financial statements supports the calculation of many financial ratios, which are powerful tools and useful indicators to measure a firm's performance, financial position and its evolution. Financial ratios are only meaningful, however, when compared with other ratios, of the same company over time or from other companies even with different currencies, sizes or industries. This study focuses on analysing the Return on Equity (ROE) ratio of TAP, which is a profitability ratio especially relevant for shareholders. The paper proceeds as follows: after this Introduction, Section 2 presents a brief profile and a SWOT analysis of the company; Section 3 presents a brief literature review; Section 4 sets the research questions and methodology, that is the DuPont Analysis that breaks down the ROE in a product of several ratios, and allows understanding the factors that most affect the ROE; Section 5 answers the questions: it provides calculation of the ROE ratio for TAP, and ratios are compared over time and with competitors, namely the income taxation (tax burden), the financing decisions (the discussion of capital structure and interested burden) and the investing decisions (return on assets). Finally, the Conclusion, together with the limitation of the analysis and suggestions for possible future research are presented.

2. The Company: brief profile and SWOT analysis

TAP was created in 1945 as the Portuguese flagship company. TAP, SGPS, SA is 100% owned by the Portuguese state through Parública Company. By the end of 2009 the Group had direct control over five subsidiaries and had indirect control or participated in another 13 companies, almost all connected with airline transportation or services associated with it. The Portuguese government announced its intention of beginning TAP's privatization process during 2012. At

the moment, TAP operates in 65 routes over 31 countries. In 2009 more than 9 million passengers flew with TAP and the company exceeded 94,000 tonnes of mail and cargo.

In the past years TAP expanded its routes to market niches, namely Brazil and Africa. This expansion was done to take advantage of the relationship between Portugal and the countries of Portuguese language. In 2009 TAP operates regularly on 65 routes worldwide. TAP is leveraging the geographical position of Portugal to connect Europe with Africa and America. The strategy of TAP implementation in Brazil and other South American countries is contributing to balance the losses of passengers in the traditional routes in Europe. In 2009, TAP was the biggest exporter in Portugal contributing with around EUR 1.4 billion in sales and services to the external markets. Figure 1 shows a summary of TAP's strengths, weaknesses, opportunities, and threats (SWOT).

Strengths	Weaknesses
<ul style="list-style-type: none"> - Flagship company (Portuguese airline company); - Portugal government as sponsor; - Implementation of structural plan to increase performance and cut costs; - Environment and social concerns; - Stable technical group; - Star Alliance partnership; - Brazilian market; 	<ul style="list-style-type: none"> - Portuguese economic situation; - Financial situation in past years; - Higher headcount number when compared with other flagship companies; - Portuguese government ownership; - Small company.
Opportunities	Threats
<ul style="list-style-type: none"> - Portuguese-speaking countries routes; - Globalization (open new niche markets); - Portugal becoming more attractive as a tourist destination. 	<ul style="list-style-type: none"> - Low-cost airlines; - Fuel price fluctuations; - Strikes; - Natural disasters; - Weather adverse conditions.

Figure 1. SWOT Analysis of TAP Air Portugal

3. Literature review

Previous research about financial ratios can be grouped in various categories, which cover past and future performance analysis (McLeay & Stevenson, 2006; Lewellen, 2004), the economic effects of accounting figures (Encarnaç o, 2009), the size of companies (Serrano *et al.*, 1999 and 2001; Rivaud-Danset *et al.*, 2010; Gallizo *et al.*, 2001), and the decomposition of ROE, namely tax burden and capital structure (Bancel, 2002), and country and industry comparisons (Marques, 2012). It is concluded that financial ratios have been a subject of various studies and are very useful to perform financial analyses of the companies and to compare them over time, making ROE an important ratio. The DuPont Method was already used to analyse the ROE ratio of individual companies, and groups of companies, but at the time of conducting this analysis and writing this document, the existence of such an analysis for TAP is not public knowledge.

4. Methodology : ROE – the DuPont method

This study aims to answer some Research Questions (RQ) using the DuPont analysis methodology. The first question is related to the variation of TAP's ROE over time and is as follows:

RQ 1: What are the values of the ROE of TAP over the last years?

The return on equity is a profitability ratio that measures the rate of return on the shareholder's equity. It is calculated using formula [1]

$$ROE = \frac{Net\ Income}{Equity} \quad [1]$$

In order to find the main sources of differences in the ROE, the DuPont method breaks this ratio in a product of ratios (regardless of extraordinary decisions): tax burden (1), interest burden (2), leverage effect (3), effect of fixed costs (4), gross sales margin (5), and total asset turnover (6), giving

$$ROE = \frac{Net\ Income}{EBT} \times \left[\frac{EBT}{EBIT} \times \frac{Assets}{Equity} \right] \times \left[\frac{EBIT}{GSM} \times \frac{GSM}{Sales} \times \frac{Sales}{Assets} \right] \quad [2]$$

Three additional research questions aim to know more about the factors which impact on TAP's ROE, such as taxation, financial decisions and investment decisions. DuPont analysis is used in order to answer to them. Marques (2012) presents a clear description of the model, which is followed in this research.

RQ 2: How does income taxation affect the ROE?

The tax burden measures the effect of the amount of taxes paid every year by the company. Through this ratio it is simple to obtain the effective tax rate. This rate is not necessarily equal to the nominal tax rate, however; the latter is the percentage stated in the Corporate Income Tax Code, while the former, effective tax rate, (t) is calculated by dividing the corporate income tax by EBT (Earnings Before Taxes), and the tax burden is $(1 - t)$, since companies use tax management and planning decisions to originate a gap between effective and nominal tax rate. Moreover, the higher the corporate tax rate, the lower the ROE will be.

RQ 3: How does the effect of financial leverage affect the ROE?

The leverage effect and the interest burden ratios represent the financing decisions of the company. The former measures the degree of financial leverage of the company and it shows that as the company becomes more leveraged, the ROE increases. The higher the leverage, however, the higher the financial expenses. This can be analysed in the interest burden ratio that quantifies the effect of financial costs and income, and shows that the higher the interest expenses, the lower the ROE. Taking into consideration these two factors, there is a trade-off between the leverage effect and the financial expenses. To better understand this, it is important to look at the compound leverage factor (Interest Burden \times Leverage Effect) that shows the aggregate effect of the leverage and of the interest burden. If the compound factor is greater than

unity it means that it has a positive contribution on the ROE, and therefore the company is profiting from using debt. The compound leverage effect is larger than unity only when the Return on Assets before taxes ($ROA = (\text{Earnings before Interests and Taxes}) / \text{Assets}$) is larger than the average interest rate paid on the borrowings.

RQ 4: How does return on assets affect ROE?

The contribution of the investing decisions to the ROE can be explained by the ROA ratio, when decomposed in three additional ratios: the effect of fixed cost, the gross sales margin (GSM) and the total assets turnover. The effect of fixed costs measures the operating risk of the company: it indicates that the higher the fixed costs the lower the ROE. The gross sales margin ratio is what remains from sales after deducting the costs associated with the goods sold (COGS) and measures the amount of profit *per* unit of sales. As expected, a larger gross sales margin contributes positively to the ROE. Finally, the assets turnover ratio indicates how efficient the company is using its assets in generating sales.

This research is based on data collected from the consolidated annual reports of TAP available in the company's website. Comparative information of easyJet and Lufthansa was taken from each of these company's financial statements available online. The data collected cover the periods 2008-2011, except for industry data, which cover a five-year period, and for easyJet and Lufthansa data which refer to 2009. Since 2005, companies listed on the European Stock Market, with consolidated accounts, should adopt the IFRS/ IAS when preparing the consolidated accounts. The period of analysis ends in 2011, which is the most recent complete year for which data fundamentals are available. The method used is DuPont Analysis. It is a single case study.

5. Results: financial and DuPont analysis

This section contains the answer to the research questions set out above: calculation of ROE. It presents possible causes for the results, and possible consequences for the future of the position under diagnosis.

Return on equity (RQ1): With the exception of 2009, TAP has registered negative results in the whole period of analysis. The year 2008 was by far the worst year with negative results of EUR 286 million, 2009 had a profit near 0 and 2010 and 2011 registered results of EUR 53 million and EUR 73 million, respectively. The main reason for the worst result in 2008 was the impact of fuel prices. From 2008 to 2009 the reduction in fuel expenses represented about EUR 345 million. The analysis of TAP's ROE is challenging since the company registers negative equity in the whole period of analysis, which would, in an automatic computation of the ROE, provide positive values in years of negative profits. For this reason the analysis and comparison of the company profitability has to be made with some caution based on the answers to the other RQs. Nevertheless, one can conclude that, although results are almost always negative, TAP's profitability has improved since 2008 but is below the Industry average.

By going over the profitability ratios of 2009 (a year with positive profits for TAP) in more detail, we find that the Gross Profit Margin is the only one where TAP clearly presents a superior performance when compared to the Industry. This result is achieved because TAP is generating higher sales *per* asset than the Industry (higher asset turnover) and is efficiently controlling its variable costs.

Table 1. Profitability Ratios

						Lufthansa easyJet		Industry
		2011	2010	2009	2008	2009	2009	5 yr avg
Gross Profit Margin	<i>Gross Profit / Net Sales</i>	26%	31%	35%	22%	44%	24%	19%
Operating margin	<i>Operating margin / Net Sales</i>	-1%	0%	2%	-8%	1%	24%	0%
Return on Sales	<i>Net Income / Net Sales</i>	4%	6%	10%	-2%	7%	8%	9%
Return on Assets	<i>Net Income / Total Assets</i>	-4%	-3%	0%	-13%	0%	2%	0%
Return on Equity	<i>Net Income / Total Equity</i>	NA	NA	0%	NA	-2%	5%	1%

Source: Airlines' financial statements
Reuters' website

When looking at the operating margin, however, TAP's competitive advantage almost disappears. This is a result of some inefficiency in TAP's workforce (Lufthansa reaches a revenue *per* employee of EUR 190,000 *per* worker, 17% higher than TAP's EUR 163,000 *per* worker). Indeed, the industry shows a 19% reduction going from Gross Profit to Operating Margin, while TAP faces a 33% reduction in the same variables, in which salaries alone represented about 23% of TAP's sales in 2009. As we move to the Return on Sales Ratio, TAP gets even closer to the Industry Average due to a somewhat worse financial result and higher level of taxation (see next section for details). Because Owner's Equity has a negative value, the calculation of the Return on Equity (ROE) doesn't offer very significant information. Even if Owner's equity was positive, and assuming all the other elements remained constant, ROE would always register a very low value since absolute net profit is very close to zero. The high competition and the high fuel expenses are reflected in the low ROE of the Industry, about 1.4%.

Taxation (RQ2): Given that TAP registered negative profits in almost every year in the period in analysis, it would be expected that taxation shouldn't play a very important role in the company's net income. Indeed, with the exception of 2009, the computation of the tax burden ratio would be misleading, because both EBT and NI have negative values. In those three years, however, taxes contributed to an even more negative result, and for 2009 the NI/EBT ratio presented a value of 0.01%, which equals a Tax Burden of 99.9%. This value is much higher than the nominal tax rate for Portuguese companies, and it is being distorted by taxes paid by some profitable companies that are partly owned by TAP's group, and which could not be part of a fiscal consolidation under current ownership limits. Considering the Portuguese taxation, it would be expected that TAP would register a ratio around 70%, a somewhat more competitive value than the 63% of the industry. In the near future, if the company starts to have positive profits, it should register a very competitive interest burden ratio since it will be able to fiscally carry forward accumulated losses.

Financing decisions (RQ3): The effect of the financing decisions on ROE can be broken in two factors: the effect of financial costs and of financial leverage.

Interest burden ratio: With the exception of 2009, the computation of the interest burden ratio would be misleading because both EBT and EBIT have negative values. In those three years, however, interest contributed to an even more negative result and, for 2009, the NI/EBT ratio presented a value of 15%, which reveals that financial results represent about 85% of the EBIT. The interest burden reduced from around EUR 80 million in 2008 to around EUR 40 million yearly from 2009-2011.

Table 2. DuPont multiplicative analysis

						Lufthansa	easyJet	Industry
		2011	2010	2009	2008	2009	2009	5 yr avg
Taxation Burden	<i>Net Income / EBT</i>	NA	NA	0%	NA	NA	130%	63%
Interest Burden	<i>EBT / EBIT</i>	NA	NA	15%	NA	-85%	91%	144%
Margin*Sales Turnover	<i>EBIT / Assets</i>	-1%	0%	2%	-13%	1%	2%	1%
Leverage	<i>Assets / Equity</i>	NA	NA	NA	NA	426%	281%	171%

Source: Airlines' financial statements
Reuters' website

For the industry as a whole, the value of this ratio is 144%, meaning that the financial result is contributing for an increase of the industry's final results. This somewhat unexpected result is probably due to the characteristics of the airline business with payments occurring before receivables. A particular analysis of easyJet shows that the Financial Result has a relatively low impact, about 9%. In Lufthansa's case, the Interest Burden Ratio is negative due to the fact that the Financial Result transforms a positive EBIT into a negative EBT.

Leverage effect: TAP is highly leveraged for the whole period. TAP has a negative total equity in the period, meaning it is financing its assets totally based on debt capital. The industry has a leverage ratio of 170% which means that, in order to finance EUR 1.7 of assets, companies are using EUR 1 invested by shareholders and is raising EUR 0.7 in debt. The compound ratio of the industry has a value of 2.46, which is much greater than unity meaning that the financing decision is contributing positively to the ROE. On the other hand, TAP, in spite of not being possible to compute a meaningful compound factor, is seeing its ROE being penalized by its financing decision and extremely high leverage.

Investing decisions (RQ4): The investing decision ratio presents a great improvement from 2008 onwards. In 2009 TAP registered a ratio of 2%, slightly better than the industry average. Since returns on sales in 2009 are slightly lower than the industry, TAP's better results come entirely from the Sales Turnover indicator, in which TAP has a result 20% above the industry's average. This is a clear indication that TAP is making an efficient use of its assets. Indeed the company registers a total assets turnover of 110% in 2009 while easyJet and Lufthansa register a ratio of 80 and 70%, respectively.

6. Conclusions

This project adds to the existing literature on using financial ratios to analyse a company's performance since the analysis of this specific company is done here for the first time. In order to understand the factors that affect ROE of TAP, the DuPont method was used.

It was observed that the company's profits were always negative over time, with the exception of 2009. TAP is therefore underperforming the industry, on profitability terms.

The first issue that affects TAP's ROE is the tax burden. The effective tax rate registered in 2009 is huge (99.9%), but it is distorted by the low Net Income value and by consolidation issues. The possibility of carrying forward accumulated losses should lower the future tax burden. A second source of difference for ROE of TAP and its competitors is in the financing decisions, which can be divided into two components: the leverage and the interest burden. TAP has a negative equity, which reveals a high level of leverage and which results on a higher interest burden than the competitors as it is using debt to finance its negative accumulated results. Another probable cause for the higher interest burden may be the higher general interest

rates due to the superior default premium on TAP's companies. Finally, to complete the ROE analysis, it was observed that TAP is achieving a better performance than the industry in terms of gross margin and asset turnovers, which means that the company is giving a better use to its assets than the competitors. Since ROA has continuously registered negative or near zero values, the high level of debt is damaging the company's performance even more. If this situation continues, the high level of debt is threatening the company's viability, in spite of the good operational performance.

Summing up, it was observed that ROE of TAP relied more on the financing decisions and was less dependent on the investing decisions. The decomposition of the investing decisions ratio (ROA) might be a subject for future research. In spite of the current negative equity, if potential investors believe that they could improve the efficiency of its workforce and that the current operational efficiency will leverage the results in the fast growing markets of South America and Africa, where TAP has strategically moved to, they might have a positive valuation of the company during the privatization process. TAP, as other flagship companies of the "traditional" business model, are facing an adverse market environment, with strong competition from low cost airlines, and high fuel costs that shrink operational margins.

The analysis shows, however, that TAP has done a significant effort to position itself to serve a growing demand for transportation between Portugal and other Portuguese-speaking countries with emerging economies, which partly offsets the negative effects of a global recession.

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The impact of airport security checks on airport commercial revenue and the passenger travel experience

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Abstract: September 11 led to increased aviation security regulations on a global scale. After the 9/11 terrorism attack, a series of new security procedures have been introduced at airports worldwide. This has led to longer passenger security check process time than before in the airport, and a dramatic reduction of passenger dwell time, which means passengers spend less in airports due to the short waiting time before departure. This is claimed to have led commercial revenue to decline in many airports. In order to identify how airport security checks impact airport commercial income and passenger experience, a passenger survey has been conducted at Birmingham Airport to investigate the relationship between the procedure and time of airport security check and airport commercial revenue, as well as the passenger travel experience. The research result shows that airport security check experience does impact on the spending of passengers in the airport waiting lounge. Detailed passenger spending profiles are described and analysed in this paper based on a case study. S&M airports could use the survey results to design their airport commercial concessionaire activities.

Keywords: airport security check, passenger experience, dwell time, small and medium size airport (S&M airport).

1. Introduction

The emergence of low cost airlines and airport privatization at the end of the last century has led to the emphasis on airport non-aeronautical revenue, which includes duty-free shops, retail businesses, restaurants, car parking and hotels in and around an airport. Non-aeronautical revenue has become more and more important for airport income. In 2006, 48% of airport revenue came from commercial, non-aeronautical revenue compared with 41% in 1983. In 2011, the commercial income of Birmingham Airport occupies 51.2% of the airport total revenue compared with 43.5% in 2006. There are several factors influencing this trend. One is the demanding of lower aeronautical charges by airlines which results in less aeronautical income for the airport. Another causal factor is the competition between airports within the same catchment area. A specific case is where Ryanair pulled out of Manchester airport in 2009, which resulted in the airport losing 44 flights and thousands of passengers *per* week (Telegraph 2009). Therefore, airports have to focus more on passenger-generated revenue to offer subsidised rates to airlines in order to attract and keep them. This led to airports focussing on customer needs and investing in commercial facilities such as car parks and offering concessions to outside organizations such as retailers, in order to boost their commercial revenue and counter a decreasing aeronautical income.

A well-known characteristic of the aviation industry is its fragility and many factors can decrease the demand of air travel. For example, the estimated cumulative losses over the six days of the eruption of the Icelandic volcano in April 2010 has calculated that on average each passenger is worth approximately USD 35 to airports and USD 179 to an airline. Comparing with the short-term influence on airport revenue of poor weather or industrial strikes, the change of regulations, especially the procedure of aviation safety and security, will impact in the long

term, which creates a challenge for airports and forces them to consider their strategic plans to cope with those changes (Sicker 2010).

2. Review of aviation security regulations, equipment and passenger experience

Due to technological improvement and development of aircraft, air travel has become easier, more affordable and has grown significantly worldwide. Millions of people pass through airports every day, which includes passengers, visitors and airport staff (Edwards 2007). This is one of the reasons why airports are acknowledged as, and have proved to be, a target for terrorism. The primary aim of airport security is to protect employees, passengers and aircraft from acts of terrorism. This includes passenger processing methods, security equipment, security staff training and procedures (Kathleen 2009). The Airport security process includes scanning passengers and their hand and hold baggage, but security processing methods and security equipment differs in different countries and airports (Sweet 2009). A series of new aviation regulations and rules have been issued in the UK and over the world after various terrorism attacks, especially after 11 September 2001. This includes 100% Hold Baggage Screening (HBS) regulation, the Prevention of Terrorism Act in 2005 (replaced the Anti-Terrorism, Crime and Security Act in 2001, UK), adoption of a no-fly list and passenger profiling, shoe scan rules, the regulation of drop-off zones at all UK airports, body scanning, hand baggage and liquid limitation.

These strict regulations have caused huge investments in airports, as airports have to purchase a range of security equipment and detection systems to prevent any dangerous items moving onto aircraft or outside the airport facility, such as metal detectors, backscatter X-ray, Explosive Detection Systems (EDS) and Explosive Trace Detection (ETD) (Sweet 2009). Detection systems are used to both check passengers as well as their luggage, which ensures that they are not carrying any dangerous items which could pose a danger to themselves or others (Matthews 2010). For example, the Department of Homeland Security of the US has funded over USD 40 billion for airport security costs since September 2001 (Bandyk 2010), and airport security costs within the UK are believed to have increased by over 150% since the terrorist attack in 2001 (BBC 2007). The UK airport security cost is, however, passed on to airlines, which subsequently pass the added cost on to their passengers.

Scanning equipment is also very expensive and it can be costly for airports to implement within terminals, along with the cost of training security personnel. This will drastically affect the profits of the airport after they invested in enhancing passenger experience of the security procedure (Attewill 2011). The government is also monitoring airports so that they do not pass an inflated security cost onto passengers. They also take into account the national security threat level which, if increased, will subsequently increase the cost that a passenger pays for security (House of Commons Transport Committee 2007). When the threat level is increased, the security levels at airports are increased, which could hinder the passenger experience (Home Office 2011) and reduce the airport commercial revenue due to unhappy passenger experience and less dwell time for shopping.

Sicker's study (2010) shows that passenger stress levels increase from the beginning of their journey and hit a peak when they go through the security process. A passenger's experience of the airport starts when the journey to the airport begins, which means that if they are running late, or held up by traffic, their stress levels increase, which builds up a state of dissatisfaction with the airport transport links. Passenger satisfaction with airport security is determined by their experience of the security process. If it is a smooth process without any hassle (e.g., no pat-

down or bag search) the passenger will be happy. A bad experience such as a delay or extra hassle due to the security check arouses a passenger's dissatisfaction with the airport security process. Park and Jung's research (2011) finds that satisfied passengers will spend more in the airport. This result has been enhanced by Zellan (2003) that the passenger experience depends upon the efficiency of the airport security process, which also indicates a positive correlation with airport commercial revenue. Therefore, airport security should aim to shorten passenger processing queues in order to create a nice passenger airport security experience, and generate more passengers shopping in the airport.

A Civil Aviation Authority (CAA) study at Manchester and the London airports found that the majority of passengers (78%) expect the waiting time at security to be less than 20 minutes, while 44% expect to wait less than 10 minutes. Another 23% of passengers said that the security procedure had little or no effect on their departure experience. This means that 77% of passengers believe that the security process affects their departure experience (Myant & Abraham 2007). The vast majority of passengers (90%) prefer to spend money airside (after security). As a result, in order for airports to maximize their commercial income they should focus on developing commercial concessions within the departure lounge (Martel 2009).

An interesting topic is how passenger spending would be impacted by the airport security process and experience, and which passenger group is more likely to be influenced. Therefore, this research aims to identify at what level airport security procedure affects airport commercial income, and to find the relationship between passenger spending in an airport and airport security check waiting time. Based on the analysis, appropriate solutions for airports to increase their commercial revenue are provided at the end of this paper.

3. Research methodology

This research is focussed on how the above issues impact on small and medium size airports (S&M). Large international hub airports have over a million transit passengers per year, and some of these passengers often stay in those airports for over 2 hours to wait for their connecting flights and are willing to spend money in the airport during their waiting time. Most S&M airports are either the departure origins or final destinations, with very limited transit passengers. Thus, how to generate a good shopping environment for the departure passengers is vital to airport commercial revenue.

Birmingham airport (BHX) is chosen as a case study of S&M airports in this paper, because it is a regional international airport with over 8 million passengers per year. BHX is located in the heart of the UK, where 8 million people can travel to the airport within one hour, or 36 million within two hours (The Route Shop 2012), as well as being the 7th busiest airport in the UK in terms of passenger throughput. Figure 1 illustrates the proportions of commercial income of BHX from 2005-2011, which shows the trend that airport commercial has become more and more important recently.

4. Data analysis

A survey was conducted in BHX in March 2012, which adopted a stratified random sampling method. There were 177 completed questionnaires in total. Within the responded 177 questionnaires, 65% are males and 35% are females; 75.7% are leisure travellers and 21% are business passengers; 5% of those people travel domestically, 75.7% travel within EU, and 19.2% travel outside the EU.

Figure 2 shows the questionnaire passenger age-group, in which the majority population are aged 51-69 (31.6%), and age group of 36-50 follows (28.8%).

Figure 3 illustrates the expected and actual waiting time of the security check procedure of passengers in the survey. 36.5% of survey business travellers and 28% of the leisure travellers expect to be waiting at security for between 6 and 10 minutes, but in reality the actual waiting time was much less than expected.

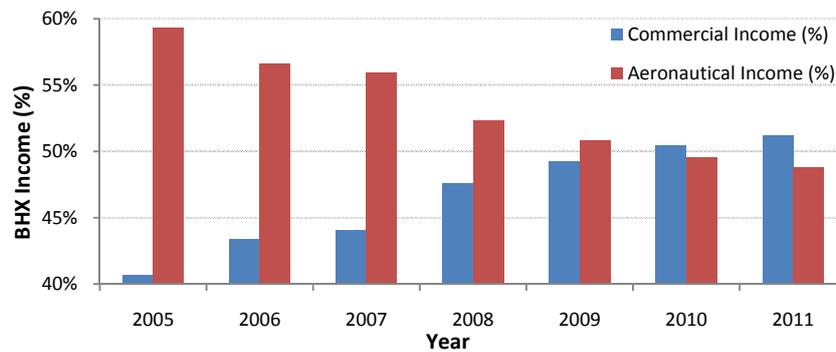


Figure 1. The aeronautical and commercial income distribution of Birmingham Airport (2005-2011).

Eighty-one percent of business passengers expected to be waiting for less than 10 minutes, whereas 61% of leisure passengers expected to be waiting for less than 10 minutes. On average 84.5% of all passengers were processed through security in less than 10 minutes, which would suggest that business passengers are more accurate at estimating how long they expect to be waiting, as they are most likely to be frequent flyers. This would also suggest that business passengers are more demanding compared to leisure passengers, as only 19% expected to be waiting for over 10 minutes, compared with 39% of leisure passengers.

The majority of business travellers can accept waiting for 10 minutes for the security check, while leisure passengers are more tolerant of longer security check waiting time. As shown in Figure 3, the expected curve of business people is ahead of that of leisure passengers. A passenger-expected waiting time of 6 – 10 minutes has the highest percentage (35% or so) for both business and leisure people. Less than 6 minutes, the percentage of business people is higher than that of leisure travellers, which means more business passengers expect less waiting time. For more than 10 minutes, the percentage of expected waiting time for business persons is less than that of leisure travellers at each measured point, which reflects less percent of surveyed business men/women expect longer waiting time.

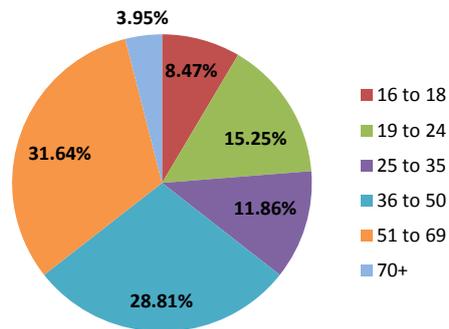


Figure 2. BHX survey passenger age distribution.

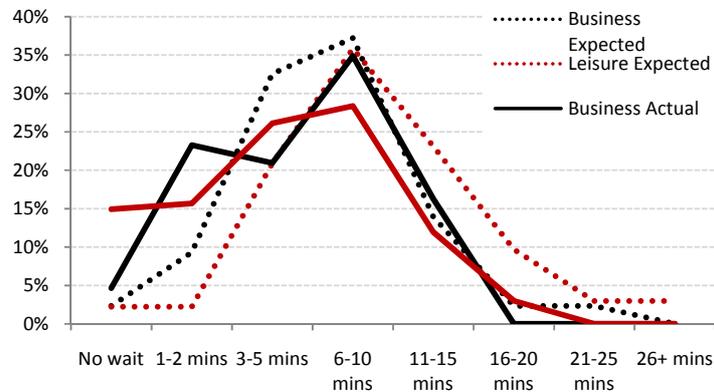


Figure 3. Expected and actual waiting time at airport security check point

That the actual curves of both business and leisure passengers stay left from the expected curves in Figure 3 means BHX security checks have lower waiting time than what passengers expected. In other words, the security passenger processing of BHX is very efficient, and much better than passengers' expectation.

Figure 4 compares the satisfaction levels of passengers with the amount spent within the departure lounge. It indicates that the majority of satisfied passengers will spend between GBP 5 and GBP 9.99, and dissatisfied passengers will spend between GBP 2 and GBP 4.99. Therefore Figure 4 would support the theory that passenger satisfaction will affect the amount spent within the departure lounge. Overall within the survey, only 9% of passengers were dissatisfied.

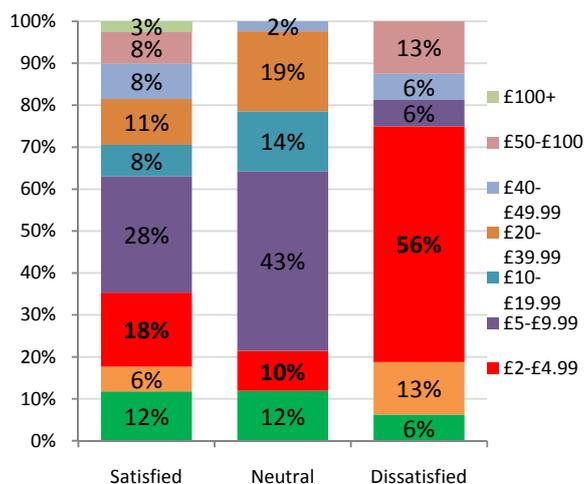


Figure 4: Passenger satisfaction levels and their airport (£ ≡ GBP).

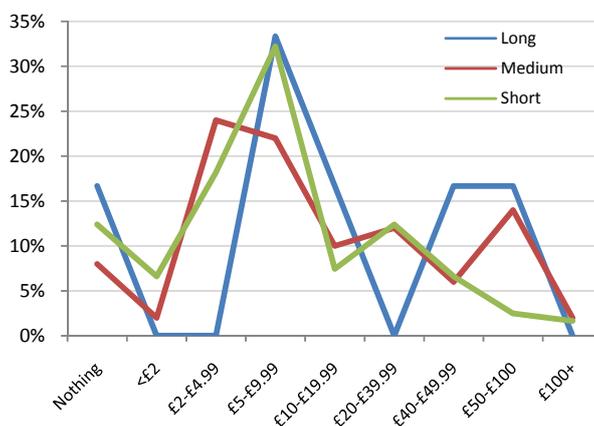


Figure 5. The relationship between passenger spending and travel distances (£ ≡ GBP).

Figure 5 shows that the majority of long and short haul passengers spent between GBP 5 and GBP 9.99, while the majority of medium haul passengers spent between GBP 2 and GBP 4.99. This survey would also suggest that long haul passengers spend the most within the departure lounge as the average passenger spent GBP 25, medium haul passengers spent on average GBP 22.81, and short haul passengers spent the least amount with GBP 14.44. Therefore this graph indicates that the type of flight does also have an effect on the amount spent within the departure lounge.

Figure 6 shows that the type of airline also impacts the amount of money that passengers spend within the departure lounge. It shows that Holiday Charter (HC) passengers spend on average the highest amount, which is GBP 28.88, Full-Service Carrier (FSC) passengers spend GBP 19.43, while Low-Cost Carrier (LCC) passengers spend GBP 13.97.

Figure 7 shows that both business and leisure females have a very similar spending pattern. Female passengers are very unlikely to spend their money within a pub (0%), but are most likely (40%) to spend their money within retail.

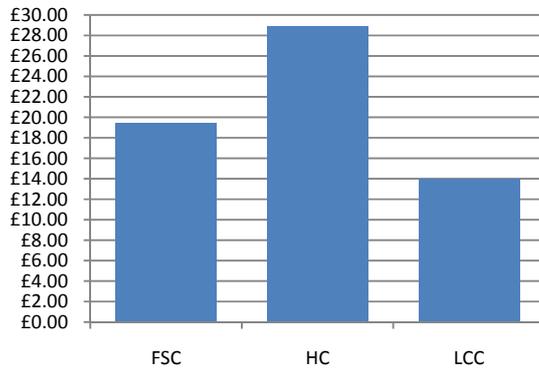


Figure 6. Passenger expenses by different carrier types (£ ≡ GBP).

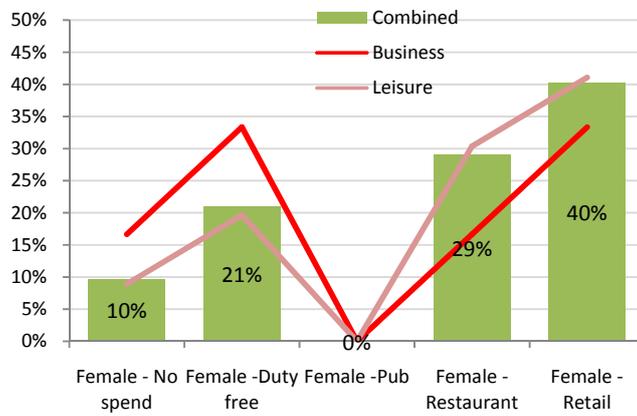


Figure 7. Female passenger spending pattern.

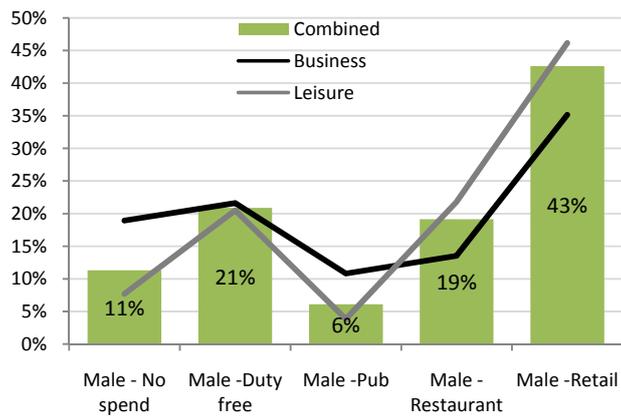


Figure 8. Male passenger spending pattern.

Figure 8 shows that business and leisure males also have very similar spending patterns. Male passengers are least likely to spend most of their money within a pub either (6%). Male passengers are, however, 3% more likely than females to spend most of their money within retail, while female passengers are most likely to visit a restaurant (10% higher than the rate of male travellers). There are about 10% of passengers spending nothing in the airport, no matter they are female or male.

5. Conclusion and recommendation

The BHX data show that the procedure of airport security check is very efficient and better than average passenger expectation as 84.5% of passengers spent less than 10 minutes at the BHX security check. The majority of passengers can accept a 10-minute waiting time for the airport security check procedure. Therefore, S&M airports can use 10 minutes as the benchmark for their airport security check process, but without compromising any safety or security risks or requirements. This survey result indicates that a positive relationship exists between the airport security check experience and passenger spending within the airport departure lounge. A satisfied passenger would spend more than a dissatisfied one.

A long-haul passenger on average spends the most, and a short-haul passenger on average spends the least in the survey population. Among different carrier types, passengers of charter airlines spend the most in the airport lounge, while low cost carriers' passengers spend the least. This is against the view that LCC passengers spend more money in airports as they may buy food or drinks in order to avoid the additional charges of foods and drinks in flight. Retail shops are the most popular for passengers in the airport for both male and female travellers, as well as for both business and leisure travellers.

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Airports' environmental impacts: results from the evaluation of sixteen international airports

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Abstract: Airports are an essential part of the aviation business and in most cases have become major factors of the economic regional development. The disturbance of the environment caused by airport activity, however, constitutes issue that impacts directly on the future growth of aviation. Therefore, a key challenge for the aviation industry is to keep the balance between environmental impact and business development. This paper deals with the assessment of the airports' response on environmental impacts mitigation. Based on multi-criteria analysis concept the measures/actions towards mitigation of the environmental impacts in a sample of 16 airports are evaluated, providing key messages to the industry towards sustainable development of the aviation business.

Keywords: aviation, airports, environmental impacts, sustainable development.

1. Introduction

Planners, economists and managers recognize the essential role of the aviation industry in the global economy. Considering a worldwide tendency, ICAO 2007 long-term forecasts, scheduled traffic in terms of passenger-kilometres, is expected to increase at an average annual rate of 4.6% for the period 2005-2025, while in the Middle East region this rate is expected to reach 5.8%. In Europe, according to Eurocontrol's (2010) long-term forecast, the average annual growth until 2030 will be around 2.8%. Taking into consideration the anticipated growth in air traffic demand, there is a clear need for airports to invest in new infrastructure to increase their capacity.

The significant role of airports on regional economies has been prominently recognized by many researches; airports bring significant social benefits and in many cases they are thought to be the single largest generator of economic activity in the regions they serve (Air Transport Action Group (ATAG), 2008). Airports have a considerable effect on a city's/region's development, as they impact on local traffic, employment, economy and environment (Dimitriou *et al.*, 2011). Although the benefits of aviation growth are significant, the environmental implications of meeting the new demand are significant too. Many researchers (Thomas & Lever, 2003; Upham *et al.*, 2003) highlight the impacts on the environment and local communities are considered to be issues that relate directly to future airport growth.

Environmental-impact mitigation is becoming one of the biggest risks in aviation and one of the major constraining factors for an airport's development. According to Eurocontrol (2008), climate change, ground transport access and third party risk, as well as adequate energy and water supplies are some of the issues that could constrain aviation growth in the future. Thomas *et al.* (2009) mention that airport management that aims at achieving a balance between the costs and services provided can help reduce the potential of environmental issues to emerge as capacity constraints. Consequently, the challenge for airports' operators will be to balance the social and economic benefits of an airport to a region or city, with the disturbance on the environment and on human health (Daley *et al.*, 2008). Therefore, airports, in order to gain environmental capacity, need to invest in environmental management and Dimitriou & Voskaki

(2010) mention that in most of the cases airport environmental management is mainly focussed on identification, assessment and control of the environmental impacts that may act as operational or capacity constraints.

Within the global context, airports have significant impact on the global environment in terms of climate change. It is noteworthy that aviation is responsible for 2-3% of the carbon dioxide (CO₂) emissions from anthropogenic sources which are continually increasing (Lee *et al.*, 2009; Intergovernmental Panel on Climate Change (IPCC), 2007). At the local level, even though noise seems to be the main concern over the last 20 years, emissions, resources availability, waste and waste-water management are also some important issues directly linked to local communities' tolerance.

Almost all airports are aware of the main environmental impacts associated with their activities, mainly through compliance or as a result of implementing an environmental management system. While environmental management performance appears to be important for the airport development, however, not many operators or airport authorities present an action plan focussed on reducing the total environmental impact of airport operations (Daley *et al.*, 2008). This paper deals with the assessment of the airports' actions towards mitigating environmental impacts. The measures towards mitigation environmental impacts in a sample of 16 international airports located in different contents are reviewed, providing key messages to the industry towards sustainable aviation development.

2. Airports environmental actions

2.1 Evaluation approach

Recent literature on the transport sector highlights that sustainable development concept relates the airport operation to actions towards adaptation of climate change and mitigation of the environment disturbance (UNECE, 2011; Daley *et al.*, 2008). Parliament Office of Science & Technology (2003) highlights that the control of the energy and water consumption for each productivity unit, the low water use and the reduction of wastes generation constitute the key pillars of actions to be incorporated in sustainable development planning.

The evaluation approach is based on multi-criteria methodology framework. Considering an airport as an input-output product line, sustainable development, amongst others, implies three categories of evaluation criteria: (a) the control of resources consumption, (b) waste generation, and (c) the recycling of resources. The three categories include specific actions widely used in airport operation which constitute the sub-criteria of the evaluation.

Therefore, environmental performance (E) assessment could be given by the following equation:

$$E = C + R + W, \quad (1)$$

where

C = number of sub-criteria succeeded in resources consumption category,

R = number of sub-criteria succeeded in recycling resources category,

W = number of sub-criteria succeeded in wastes generation category.

The sub-criteria for each category are analysed in the following paragraphs.

2.1.1 Resources consumption

Airports need large quantities of electricity and water for the operation of their infrastructure. Energy consumption is mostly associated with heating, ventilation, air conditioning and lighting (Graham, 2008), while water demand refers to terminal, fire service, maintenance and apron

activities. The most common applied measures to reduce energy and water demand usually include efficiency improvements. For the purposes of this research the following actions are taken into consideration:

1. Energy-efficient lighting systems (e.g., application of new technology such as LED lighting in terminals, aprons or in other parts of landside).
2. Energy-efficient heating/cooling systems (e.g., installation of control systems at terminals).
3. Smart and demand-operated switches (e.g., installation of smart switches that activate equipment when needed, like sleeping escalators, or turn-on lights when they detect the presence of people).
4. Co-generation systems (e.g., installation of combined heat, power and cooling plants).
5. Low-water consumption features (e.g. installation of modern plumbing practices, low-flow taps, controlled toilet flushing).
6. Water-leak detection system (e.g., installation of a detection system, which operates automatically or not).
7. Irrigation management system (e.g., irrigation methods that focus the water only where it is needed or landscaping that requires no supplemental water).
8. Track water use within specific buildings or areas (e.g., installation of monitoring devices in every building to track the exact water demand and plan for reductions).

2.1.2 Recycling and using renewable resources

Besides controlling consumption, recycling or re-using water, recycling solid waste and using renewable energy are also considered significant sustainable practices. For the purposes of this research the following actions are taken into consideration:

1. Green energy generation (e.g., power generated on-site using renewable energy sources, like geothermal, solar, wind).
2. Green parking facilities (e.g., provide free power charging stations, biofuel gas stations).
3. Water recycling (e.g., reuse grey/treated water to sanitary areas/fire service/irrigation).
4. Rainwater harvesting (e.g., equipment and storage facilities to collect rainwater from roofs or other areas to be used for non-potable purposes).
5. Separate water network (e.g., installation of separate supply network to use non-potable water).
6. Selective waste collection points (e.g., recycling bins in several parts of airport for waste segregation).
7. Use of recycled/recyclable materials (e.g., use of recycled paper, or recyclable materials, toner cartridges, recycle and reuse de-icing/anti-icing agents).
8. Organic waste separation (e.g., implement organic waste recycling programme, compost green waste for reuse on the airport).

2.1.3 Waste generation

Airports' activities result in air emissions, waste water and solid waste that need to be managed to prevent pollution. Generally, the management of air and water quality is targeted at achieving and maintaining compliance with local regulations regarding noise and pollutant concentrations. Amongst them, noise and local air quality legislation has the potential to constrain airport growth either by restricting aircraft movements or road traffic (Dimitriou & Thomas, 2007). For the purposes of this research the following actions are taken into consideration:

1. Continuous descent approach (CDA) (e.g., implement continuous descent approaches).

2. Compensation schemes to those affected by noise (e.g., implement noise protection programme that includes modification to buildings).
3. Emissions-related landing charge (e.g., landing charge include a component dependent on the pollutant emissions from aircrafts, such as NOx emissions).
4. Noise-related landing charge (e.g., landing charge to include a component dependent on the noise generated by the aircraft).
5. Water quality monitoring system (e.g., monitor the quality of the water leaving the airport site or discharges from water treatment plant, monitor local surface and/or ground water resources).
6. Spill traps-oil separators or other systems (e.g., installation of hydrocarbon separators, oil interceptors or other relevant systems, preliminary purification tank, ponds).
7. Hazardous waste management system (e.g., implement a management system for hazardous waste like chemicals, oil, fuels, batteries, lamps, tyres, electric/electronic equipment, medical waste).
8. Waste charging mechanism (e.g., waste charging scheme introduced for airport retailers).

3. Key findings

The evaluation framework is applied to a sample of 16 international airports; all airports serving international flights and annual passenger traffic above 10 million passengers. The data for each airport has been collected by interviews to airport operators and available data presented in official airport operator documents such as environmental plans and sustainability reports. Table 1 presents the key facts regarding the airport sample, while Table 2 provides the environmental performance for the airport sample.

Table 1. Sample of airports

Airports (IATA code)	Passengers (millions)	Airports (IATA code)	Passengers (millions)
London Heathrow Airport (LHR)	69.4	Istanbul International Airport (IST)	37.5
Hong Kong International Airport (HKG)	53.3	Sydney Airport (SYD)	35.6
Dubai International Airport (DXB)	51.0	Toronto Pearson International Airport (YYZ)	33.4
Schiphol Airport (AMS)	49.8	Seattle-Tacoma International Airport (SEA)	32.8
Singapore Changi Airport (SIN)	46.5	OR Tambo International Airport (JNB)	18.6
San Francisco International Airport (SFO)	41.0	Athens International Airport (ATH)	14.4
Munich Franz Josef Strauss Airport (MUC)	37.8	Auckland Airport (AKL)	13.7
Kuala Lumpur International Airport (KUL)	37.7	Abu Dhabi International Airport (AUH)	12.4

(Source: Airport operators' official web-sites)

According to the results, even though airports recognize that their business activities and operations have environmental consequences, not all of them have applied specific mitigating measures; as a result, none of the selected airports meets all the evaluation criteria. Airport size appears to be a significant parameter on applied actions; most airports that have annual passenger

Table 2. Environmental performance for the airport sample

Evaluation criteria	Environmental performance (E)															
	AMS	SFO	MUC	LHR	DXB	SIN	AKL	ATH	HKG	SYD	AUH	YYZ	KUL	SEA	IST	JNB
Resources (C)	7	7	4	5	7	5	4	6	5	6	5	6	3	4	5	3
Recycling (R)	7	6	6	4	4	6	6	4	5	2	4	3	6	4	4	1
Wastes (W)	7	5	7	7	4	4	5	4	3	5	3	3	3	4	2	4
Sum	21	18	17	16	15	15	15	14	13	13	12	12	12	12	11	8

traffic above 30 million usually present higher scores on environmental performance. Generally,

actions towards controlling energy and water consumption, as well as mitigating water pollution and managing solid waste seem to be on the top of airports' agenda. On the other hand, in most of the cases only a few actions regarding green energy use and water recycling are incorporated.

Issues that may need improvement mainly regard the incorporation of modern and efficient water management techniques in order to reduce water footprint. In addition, it is highlighted that 1 out of 3 airports have not yet considered water recycling as an option. Even though most airports seem to have incorporated various techniques to control water consumption, only 31% of the sample has installed a water leak detection system to be able to react quickly in case of leakage. It should be noted that airports located in areas with scarce water resources, should incorporate in future expansion projects infrastructures and techniques that would result in lower potable water demand. Taking into consideration forecasts regarding climate change, alterations in the precipitation pattern could result in significant reduction in rainfall, reduced availability of surface water during dry periods and reduced groundwater recharge.

In the case of energy consumption, even though most airports present a plan to control consumption, applied actions mostly focus on efficient lighting. Only 1 out of 3 provide green parking facilities, implying that the use of electric or hybrid vehicles is generally not promoted. In addition, with regard to renewable energy generation most airports have installed photovoltaic panels on the roofs to cover a small proportion of energy demand; only a few airports focus their actions towards substituting carbon based energy.

Regarding green energy use, the geographic location and the age of the airport seem to be important parameters. The location of the airport plays a significant role in renewable power generation. For example, ATH, DXB and AUH are located in countries with high solar energy potential; as a result, using green energy is less expensive compared to other airports. In the case of ATH, the recently installed photovoltaic park is expected to cover around 20% of airport companies' needs, reducing carbon emissions by at least 10,000 tonnes per year. In addition, the age of airport infrastructure determines the ease with which measures towards reducing resources consumptions are implemented. At this point it should be noted that, at the moment, airports located in the Middle East are investing in creating additional capacity to match traffic forecasts. Based on the evaluation results, development plans should incorporate carbon based energy substitution.

In the end, it should be noted that an airport's location is a significant parameter that determines not only the geological and environmental status of the area, but also applied environmental legislation and restrictions that can set high standards to quality issues. Therefore, airports that are located in countries that have applied specific environmental restrictions regarding air, water or soil quality are expected to have applied more detailed measures to meet the terms of these standards.

4. Conclusions

On the topic of airport environmental system analysis, one of the greatest challenges that airport operators face is to manage successfully environmental issues that may act as constraints to further growth. Conventional wisdom of this paper is to develop a framework to assess airports' actions towards mitigating relevant environmental impact. The results suggest that in many cases applied actions are focussed on airports' obligation to operate in accordance with legislation. The challenge for airport operators is to incorporate actions beyond common compliance targets, addressing their willingness to act in a sustainable manner.

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Low cost carriers: development in the Middle East aviation market

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Abstract: The aim of this paper is to examine the rapid growth of Low Cost Carriers (LCC) in the Middle East (ME) Aviation Market. The paper is a conceptual one based on a literature review of Low Cost Carriers in the ME aviation industry. The LCC model has grown and matured around the world especially in Western nations such as the USA and Europe. In the GCC region, however, LCC is a recent phenomenon, but has a very high potential for growth. Though LCCs in the Middle East region have grown they still have implications which need due consideration by the airlines as well as the aviation authorities. One of the issue is, although the ME aviation industry is in a better position than other countries, there are few Low Cost Airlines compared to Full Cost Airlines, which is an area of concern especially for the region with high expatriate population. Most research to date has focussed on LCCs from the Western nations with limited research conducted in the GCC region. Hence, this study focusses on growth and development of the LCC market in the Middle East region.

Keywords: Middle East aviation industry, Low Cost Carrier (LCC), growth, implications.

1. Introduction

The aviation industry is a very dynamic one; recent developments such as deregulation and open sky policies have made it possible for many airlines to enter and serve different countries as well as smaller cities like Alexandria in Egypt. The major reason for growth of the aviation industry has been a robust competitive environment that has led to a more liberalized market across the world, and this has acted as a catalyst for the subsequent birth, growth and success of LCCs world-wide; previous to this the aviation industry was dominated by full-fare airlines (Ariffin *et al.*, 2010). In the industry at present, there is a strong focus on low-fare, low-cost carriers, which saw the birth of Low Cost Carriers (LCC) model since the 1990s. The entry of low-cost airlines within the Middle East region can be attributed to the deregulation policy brought about by various governments and authorities. Ever since low cost carriers have entered the aviation industry it has changed the competitive dynamics of the short-haul market. LCCs have revolutionized the way that business is conducted in the aviation sector by adopting a fresh approach on both strategic and operational issues. According to O'Connell (2007), simplicity has become their universal principle over network airlines and consequently they have achieved substantial cost advantages which are being passed onto the consumer in the form of lower fares.

In the Middle East, a new segment has emerged within the aviation industry, namely the low income passengers; the birth and growth of this segment can be attributed to the LCC airlines. In an interview with Mr Mohammed El Emam, Country Manager, Qatar Airways, he mentioned that the trend of travel and travellers have significantly changed; as result the number of potential travellers has increased after the entry of LCCs. The GCC countries have higher numbers of expatriates than locals; their population is boosted by a steady inflow of expatriates in addition to

a growth in the number of Gulf nationals. The number of people living in this region reached an estimated 46.8m in 2011 up from 33.2m in 2004, and is forecast to hit 49.8m in 2013.

Low fare is a major motivator for expatriate travellers travelling back home in cases of end-of-contract travel, Visit Friends and Relatives (VFRs), annual holidays, or to visit a destination for both short and long weekends. It has been found that LCCs have increased the volume of low income people travelling globally and within the Middle Eastern region. SKYTRAX, the world's leading airline and airport review site for over 681 airlines and 725 airports, in their research found that service quality cannot be ignored and if the LCCs are focussing on penetrating and growing in the market they will have to concentrate on not only a reduced fare but also provide decent and good quality service. Though passengers travelling with LCCs do not expect a very high level of service quality, what they do expect is a clean and well maintained aircraft, on-time take-off and landing, and that the airlines have empathy towards the passengers. This conceptual paper discusses the birth and growth of LCCs, highlighting the changes that have evolved over the years due to the developments in the aviation industry in the Middle East region. It also highlights the need to improve the service quality levels for long-term survival in the market since the passengers expect better quality with reasonable price.

2. Growth of low cost carriers

The entry of LCCs to the aviation industry has changed the perception of travellers, since they are now able to travel by air (many for the first time) with a reduced fare and a compromise on services. Prior to 1967, it was impossible for middle- and low-income passengers to undertake air journeys, the main reason being the high price which they could not afford. The inception of LCCs created affordable and accessible travel for this segment, i.e., the middle- and low-income passengers. Southwest Airlines from the United States of America was the first airline to introduce the concept of Low Cost Carriers in the year 1967, thus starting a trend in the American aviation industry. The airline operated on a unique business model: a first in the aviation industry. The model was based on three concepts: a simple product which would handle one type of aircraft, no free meals, no drinks and snacks, narrower seating leading to greater capacity, no assigned seat reservation, and no frequent-flyer programmes. The second concept was positioning, i.e., only economy class which targeted the leisure and economy travellers, providing them with a point-to-point product, promoted using aggressive marketing. The final concept that the model was built on was low operating cost; this included low wages to employees, reduced airport fees, high productivity demands from aircraft and maintenance.

In 1971, Southwest Airlines began its maiden LCC voyage with a service between Dallas, Houston, and San Antonio. By 1974, Southwest passenger numbers reached one million. Bieger & Laesser (2004) found that Southwest Airlines were among the leading LCCs that were responsible for major changes within the American and European aviation industry. New companies were established in continental Europe, amongst which the most prominent were Air Berlin (operating as a low-cost airline since 1998), Germanwings (part of Eurowings, based in Cologne and Stuttgart), German Express and Helvetic (a Switzerland-based company). The LCC trend expanded geographically moving eastwards from USA to European markets with the creation of airlines such as Ryan Air founded in 1985, and Easy Jet a decade later. It was during the mid-2000s, that the LCC business model entered the Asian market, first in South-East Asia, and then in China and India with the advent of airlines like Air Asia from Malaysia, Nok Airways in Thailand and Cebu Pacific from the Philippines.

The last decade has seen numerous studies examining LCC, but most of them focussed on the airlines in the US and EU market (O'Connell & Williams, 2005). Therefore, there is an urgent need to study the developments and experiences of LCCs from the Middle East region.

3. Low cost carriers in the Middle East

Low Cost Carrier is a relatively new phenomenon in the Middle East region. Three airlines, Air Arabia, Menajet and Transgulf Express were the first LCCs to register, in the first half of 2004. All these airlines were based in Sharjah (UAE) and began operating to Gulf, Indian and North African destinations (Francis *et al.*, 2006). Two of them, Menajet and Transgulf, were unable to begin operations due to lack of support from the local authorities (the Sharjah Department of Civil Aviation (SDCA)) and the federal authorities (General Civil Aviation Authority (GCAA)) due to the safety standards of the airlines. This left Air Arabia to become the first company to launch a low cost airline in the region and the airline began its operations from Sharjah, one of the Emirates (states) of the UAE. The airline started with two leased Airbus A320 aircraft and its maiden flight was from Sharjah to Bahrain. Now, in 2012, the airline has become one of the largest and most successful in the MENA (Middle East North Africa) region. According to company reports, Air Arabia became profitable in its first year of operation. In 2010, Air Arabia Egypt was launched as a Joint Venture (JV) between Air Arabia and Egyptian Travel and Tourism company, part of the Travco Group. According to the Dubai Chronicles (January 2012), among the LCCs in the Middle East, Air Arabia carried 4.7 million passengers in 2011.

Jazeera Airways is based in Kuwait and was established in April 2004, it is the first non-government owned airline in the Middle East and now continues to be one of the few Middle-East based non-government owned airlines, and it currently flies to 18 destinations across the Middle East. Jazeera Airways has grown from a low-cost concept airline to a hybrid low-cost carrier, with two classes, namely economy class and business class; the airline now provides complimentary meals and allows 40 kilograms of baggage *per* passenger. In 2011, Jazeera Airways carried 1.2 million passengers to destinations such as Dubai, Bahrain, Beirut, Alexandria, Amman, Damascus, Istanbul, Sharm El Sheikh, Assiut, Aleppo, Deir Ezzor, Luxor, Mashhad, Sohag, Jeddah, Riyadh, Kuwait, and Cairo. Their segments include high-demand business, leisure, family, and weekend travellers.

The second LCC that has been launched from the UAE is RAK Airways based in Ras-Al-Khaimah, an Emirate of the country. RAK Airways entered the LCC market in 2006, but due to the financial crisis of 2007-2010, it closed its operations in 2009. They have since re-launched in 2010 using the same brand name, with a hybrid LCC model along the lines of Jazeera Airways. RAK Airways is the first LCC in the Middle East to use social media like Twitter and Face Book to communicate with its passengers directly. In 2007, the National Air Services based in the Kingdom of Saudi Arabia (KSA), launched a domestic LCC called Nas Air, the airline operates to 27 cities in Asia, Europe, the Middle East and Africa. Due to high barriers to entry in the Saudi market there have been few developments in the Saudi aviation industry. The next entrant to the market was Fly Dubai a LCC based in Dubai which began its operations in 2009; the airline was initially supported by Emirates Airline. It began with its first service between Dubai to the cities of Beirut (The Lebanon) and Amman (Jordan). Since then the airline has expanded its destinations and services quite rapidly. The airline now flies to 50 destinations around the Middle East, Asia and some destinations in Europe.

LCCs have been expanding quite rapidly in the GCC region of the Middle East over the last few years. Even though some of the low cost airlines began their operations during the financial

downturn period, they have achieved success. Commentators point out that reasons for this include good service levels such as on-time performance, efficient and safe travel provided to passengers. According to the International Air Transport Association (IATA), the Middle East aviation market is one of the fastest growing markets in the world, passenger demand in the Middle East increased by 11.2 *per cent* during the recent economic downturn in the global economy, while most airlines in other regions in the world experienced a decline. The IATA association predicts that by the year 2014 the Middle East region will grow at 9.4 *per cent* within the world aviation industry. Li *et al.* (2010) suggest that even though LCCs are price conscious, service quality still exerts the second largest effect and agree that the airlines have to devote themselves to improving service quality to attract leisure and business passengers.

Grönroos (2000) in “Service Management and Marketing” explains the four aspects that airline passengers consider most significant in their flying experience. The first aspect is “Care and Concern” which the passengers would feel that the airline company offers through its employees and its operational systems, and whether these are dedicated to solve their problems. The next aspect is “spontaneity” which is whether the passengers think that the employees show willingness and readiness to reach out passengers and take care of their problems on board. The third aspect is “problem solving”: that is, when the passengers approach the front-line contact employees, they (the front-line staff) should have the knowledge and skills to solve the customers’ problems. The last aspect is “recovery”: should a problem occur, can the front-line customer service staff take action to control the situation and find a solution? This shows that the passengers not only give preference to low fare but also evaluate the services provided by specific airlines.

It has been found that airlines adopt various measures to improve their service profile such as the introduction of e-ticketing, internet booking, in-flight entertainment and enhanced safety standards. There is, however, a need to continually review the dimensions of service that customers look for in an airline. According to Aksoy *et al.* (2003) an airline needs to understand passengers’ preferences and satisfaction in order to deliver better service. Furthermore, O’Connell & Williams (2005) found that the LCC airlines have created a great impact in the global domestic passenger market by providing passengers with the means to travel with low fares and efficient services; prior to the 1960s air travel was monopolized by full fare airlines.

While the study focusses on the growth and development of LCCs in the Middle East region, the fact remains clear that passengers expect a certain degree of service quality even from LCCs. The service quality concept is an integral part of a product that is offered to an air traveller. Hence, measuring service quality is important for LCCs, to enable them to improve their product offering and garner a greater number of passengers. Most studies have used the SERVQUAL model to measure service quality within a wide range of industries (Sultan & Simpson, 2000; Gwo-Guang & Hsiu-Fen, 2005). The SERVQUAL model was designed by Parasuraman, Zeithaml and Berry in 1985, and is very often used to measure the gap between the perceptions of the service providers compared to the perception, expectations and experiences of the customers. Therefore, the LCCs like Southwest Airlines in the US, Easy Jet in the UK, Air Arabia and Jazeera Airways in the GCC are attempting to target the travel market based on strategies such as low-fare and adequate-service quality which will satisfy passengers’ needs and thus encourage them to repurchase.

LCCs in the Middle East region need to create awareness about their product, the core being “no frills”. Since Middle East passengers have always flown with full-service airlines and are used to a higher level of service, they expect a somewhat similar kind of service from LCCs as

well. Local and federal authorities should give more freedom through open-skies policies and deregulations to LCCs to provide better service and allow more freedom for other airlines to enter the market. Finally, LCCs should attract more Arab national passengers by understanding the nature of service based on their culture. National culture has been investigated and defined in many studies. One of the most widely used definitions of national culture is by Hofstede (2001) who defines national culture as the collective mental programming of the people of any particular nationality. According to him, people share a collective mental programming which distinguishes their culture from others. This mental programming shapes the attitudes, values, behaviour, competences, and perceptions of priority of that nationality. The Hofstede (2001) study discusses the notion that different cultures have varying levels of “power distance”. Nations with a large power distance, where inequality is accepted, place emphasis on a dependency relationship; in this, the Arab countries scored 80 out of 104 (a high level of power distance), and are ranked the seventh amongst the 50 countries in Hofstede’s study. This shows that passengers from other cultures might have no much problem sharing their row with low profile passengers unlike Arab passengers who might find it difficult to accommodate with the one sitting next to them, for example a low profile worker or an artisan. These are a few of the issues which could be highlighted and researched in the future.

4. Conclusion

This conceptual paper discussed the growth and developments of the aviation industry in the Middle East especially with a strong focus on Low Cost Carriers (LCCs). Service in the airline industry is given the highest preference by the passengers. While price is given higher consideration than the quality of service when travelling with Low Cost Carriers, it does not mean that LCCs can ignore the required level of service quality. The LCCs can target Arab passengers by analysing the difference of culture from western countries and position their product in that manner. The aviation authorities should consider giving more freedom to new LCCs entering this market with great future potential. The paper is in the initial stage of research and therefore further analysis will be done in the future to evaluate the importance of service quality to the low cost carrier in its growth and development stage in the Middle East region.

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Noise surcharges at European airports: an overview

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Abstract: Three different types of noise surcharges applied at European airports are described and analysed in the paper. The differentiation of movement-related charges according to noise standards is a suitable instrument if two classes of aircraft can be clearly distinguished (e.g., Chapter 2 and Chapter 3 aircraft in the 1980s and 1990s). Surcharges based on absolute noise emissions have become more widespread, especially in Germany. They provide only limited incentives for the use of modern narrow-body aircraft, however. A (revenue-neutral) surcharge based on a benchmark approach was introduced at Vienna airport recently.

Keywords: aircraft noise, airport charges, European airports.

1. Introduction

Public resistance to aircraft noise has become an important obstacle for the development of airports. For example, the recent capacity expansion of Frankfurt airport finally led to a night curfew, demanded by the highest German administration court (*Bundesverwaltungsgericht* 2012). At Munich, a referendum has prevented the construction of a third runway for several years (Stadt München 2012). Consequently, airport managers have a strong interest in effective measures against aircraft noise, trying to prevent additional growth limitations.

The first financial incentives for operating less noisy aircraft were introduced in the 1970s. Nowadays, many European airports use such instruments. According to Boeing's online database on airport charges (Boeing 2012), only seven of the 30 largest European airports do not apply a noise related surcharge (Rome, Copenhagen, Milan, Oslo, Dublin, Athens, and Lisbon).

In this paper different types of noise surcharges implemented at European airports are described and their pros and cons are analysed. Section 2 explains technical aspects of noise emissions which are of particular relevance for the functioning of economic incentives. In Section 3 aims of noise surcharges are discussed. Furthermore, the pros and cons of different types of noise surcharges are described. Examples from German and selected airports of other European countries are presented. Finally, some suggestions for further research are given in the conclusions.

2. Determinants of aircraft noise emissions

Several factors determine the noise emissions of an airplane. First of all, the technical features of an aircraft matter, e.g., the design of the engines. In general, there is a positive relation between the Maximum Take-Off Mass (MTOM) of an aircraft and its noise emissions. The certification standards set by ICAO (Annex 16) are based on noise emissions at three measurement points. The permissible noise emissions increase with MTOM. Since the introduction of noise standards in the early 1970s, Annex 16 limits have been tightened twice. Chapter 3 limits were introduced in 1977 and Chapter 4 limits in 2006.

Noise emissions of a specific aircraft model differ significantly according to engine type and other technical features. This effect can also be observed in airlines' fleet noise data. For example, cumulative noise emissions of A320-200 operated by Lufthansa are between 13.2 and 14.3 Effective Perceived Noise dB (EPNdB)¹ below the Annex 16 limits, whereas those of bmi's A320-200 fleet undercut the limits between 19.1 and 19.9 EPNdB (Lufthansa 2011, p. 85).

Noise emissions of an airplane do not only depend on its technical design but also on its current use. Especially, noise emissions vary with the actual weight of the aircraft. Therefore, they are influenced by the number of passengers, the amount of luggage and cargo transported, and the fuel carried. The last of these depends on payload as well as on flight distance. Consequently, an A320 operated by a typical holiday carrier from the UK to the Mediterranean (high load factor, large amount of luggage, rather long distance) will emit a higher noise level than the same aircraft operated by a Full Service Network Carrier on a short-haul domestic flight with a high share of business travellers. Furthermore, actual flight operations, e.g., the timing of landing gear ascending, affect the noise level. Finally external factors such as weather conditions and ATC provisions have an influence as well.

3. Noise surcharges – aims, types and examples

3.1 *Aims and general types of noise surcharges*

This paper focuses on the design of financial incentives for reducing aircraft noise. Therefore legal differences between differentiated charges, surcharges, noise levies, and noise taxes are neglected. Similar to any type of tax or charge, two aims might be relevant; if airports want to recoup noise related costs, e.g. noise insulation programmes, a noise surcharge might be a suitable option. At some airports, such revenue-oriented charges are applied, based either on aircraft movements or passenger numbers. A second target might be the creation of incentives for the use of less noisy aircraft. Then, the surcharge should clearly be related to noise emissions. As the decibel scale used for noise measurement is logarithmic, a progressive tariff is adequate.

Since noise emissions as well as the transport capacity of an aircraft (either in terms of passengers/cargo or in terms of distance) increase with its MTOM, different types of charges will have different secondary effects. If, according to the textbook model, charges are directly related to noise emissions, the noise charges for modern short-haul aircraft will only be slightly below those for older types, providing very limited incentives for fleet modernization in this segment. If a charge aims at fostering the use of 'state-of-the-art' aircraft, it might be based on the difference between noise emissions of an aircraft and emissions of a 'benchmark' model in the respective class. As a possible side-effect of such type of noise surcharge, an aircraft with relatively high, but absolutely low noise emissions (e.g., older narrow-body aircraft) might pay a higher surcharge than an aircraft with relatively low but absolutely high emissions (e.g., modern wide-body aircraft).

Moreover, it has to be taken into account that noise cannot be as easily summed up as gaseous or liquid emissions. It is not always clear whether people living in the vicinity of an airport would opt for a small number of noisy events or for a larger number of less-noisy movements.

Airlines' scheduling decisions depend on a large number of factors, including the passenger's willingness to pay for flexibility, the availability of slots, and the operating costs of the different

¹ The EPNdB is defined in Annex 16 as "a single number evaluator of the subjective effects of aeroplane noise on human beings"(ICAO 2008, APP 1-6).

aircraft. If the noise surcharge of larger aircraft is significantly above the one of a smaller model, operating aircraft with lower capacity becomes more favourable, which might lead to a higher number of movements.

3.2 Noise surcharges as part of movement-related charges

Differentiated movement fees, based on the Annex 16 noise certification, are the ‘classical’ design of a noise surcharge and are still applied at many airports. Especially in the 1980s and early 1990s, when many noisy Chapter 2 aircraft (e.g., B727) were still in service, a discount on the movement fee for using modern Chapter 3 aircraft provided an additional incentive for the modernization of an airline’s fleet, but already in the mid-1990s, the increasing share of Chapter 3 aircraft depleted the advantageous effects of this instrument. This induced, for example, the German Ministry of Transport to issue the so-called bonus-list, which contains Chapter 3 aircraft with rather low noise emissions (Fichert 1999). Due to the general ban on aircraft not certified according to Chapter 3 at European airports (EC Directive 92/14), the operation of Chapter 2 aircraft or even uncertified aircraft is a very rare exception.

The differentiated movement charges show two significant shortcomings. First, as long as the standards which serve as a basis for the definition of different classes are not currently adjusted, the differentiation loses its effect. For example, in 2011 more than 70 per cent of all aircraft operating at Stuttgart airport were covered by the bonus-list (Flughafen Stuttgart 2012b). Since there is no further differentiation, no incentives are provided within this preferential group.

Secondly, Annex 16 noise limits increase with aircraft MTOM. Thus, it is possible that a heavy bonus-list aircraft has to pay a higher charge than a non-bonus-list aircraft with lower MTOM and the same or even higher noise emissions. Whether this effect occurs or not, depends on the two charging rates, the MTOM of the aircraft compared, and the percentage differences between the respective values. At those airports which still apply differentiated movements fees, the difference between the charging rates has been increased over the years. Therefore, the effect described above is not very likely to occur nowadays.

3.3 Separate noise surcharges based on actual emissions

Many German airports have switched to specific noise surcharges, using individually defined noise categories or classes. The surcharges are usually based on the emissions measured at the respective airport for a specific aircraft model. Therefore, the threshold values defining the categories differ. Moreover, the width of the categories has not been harmonized.

The two large German hub airports, Frankfurt and Munich, have the most differentiated surcharge system in Germany with 12 and 11 categories, respectively. At Munich, the noise surcharge is combined with a bonus-list differentiation of the MTOM-based movement fee, making the system even more complicated. Whereas Frankfurt applies a constant interval of 1.5 dB(A) between the different categories, the width of the categories at Munich first decreases and then increases again (see Figure 1). It is noteworthy that the tariff at Frankfurt airport shows rather strong increases between categories 7 and 8 (from EUR 130 to EUR 317), between category 9 and 10 (from EUR 350 to EUR 1,450) and between categories 10, 11 and 12. In categories 11 and 12, however, only three aircraft types are listed (DC9, AN 124 and IL 76), which operate at Frankfurt only as an extreme exception. On the contrary, the progression rate of the noise surcharge at Munich airport is the smallest among the large German airports.

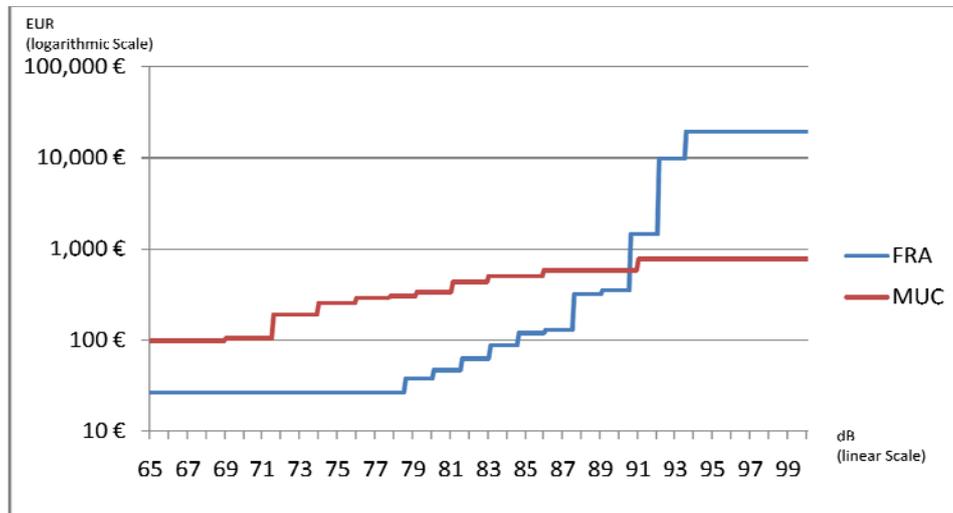


Figure 1. Tariff of noise surcharges at Frankfurt airport and Munich airport

Table 1 shows the amount of the noise surcharge for selected aircraft, comparing two short-haul and two long-haul models. These examples reveal a striking variety. At four airports, the surcharge for the modern A320 is below the surcharge for a B737-300. The same surcharge rate applies at two airports. One airport even has a higher surcharge for the A320. With one exception, the surcharge for the rather noisy B747-200 is above the surcharge for the B747-400. Some airports charge the older model significantly higher, in the case of Dusseldorf almost prohibitively high. At Stuttgart, however, the same – rather high – surcharge is applied for both aircraft types and at Munich, the difference is rather small.

Table 1. Noise surcharge at large German airports for selected aircraft (in EUR)

Airport	B737-300	A320-200	B747-200	B747-400
Berlin (TXL)	140.00	105.00	840.00	420.00
Cologne	70.00	40.00	280.00	140.00
Dusseldorf	100.00	41.00	7,000.00	100.00
Frankfurt	47.00	47.00	1,450.00	350.00
Hamburg	55.00	55.00	1,350.00	160.00
Munich	303.70	289.96	585.10	502.74
Stuttgart	69.00	108.00	1,350.00	1,350.00

Source: Berliner Flughäfen (2010), Flughafen Köln/Bonn (2010), Düsseldorf International (2012), Fraport (2012), Hamburg Airport (2012), Flughafen München (2012), Flughafen Stuttgart (2012a).

Noise surcharges based on actual noise emissions are closer to the textbook model of an emission tax than the differentiation of a MTOM-based movement fees. An example for a ‘textbook charge’ with a continuous tariff can be found in the (later withdrawn) EC proposal for a noise surcharge at community airports. Another (realized) example is the additional noise levy

at Dutch airports. A continuous tariff has the advantage of rewarding even small decreases in noise emissions. On the other hand, without further modifications it is not possible to discourage airlines from using aircraft with extraordinary high noise emissions.

3.4 Noise surcharges based on actual emissions and benchmark values

In order to account for the absolute level of noise emissions as well as the relative position of an aircraft within its class, noise surcharges might be based on benchmark values. One rather recently introduced model is the noise surcharge at Vienna airport (2012). At first, the individual noise emissions at the three measurements points (based on certification values) are logarithmically averaged. In a second step a Target Value (currently 80 dB) is subtracted from the Average Value. The resulting noise emission value is multiplied by the Noise surcharge rate (currently EUR 2.00), leading to the noise surcharge before compensation and without consideration of the noise quality. In a third step, the logarithmic average of the aircraft's maximum noise emissions based on the ICAO standards is calculated. Then, the percentage difference between the permitted and the actual noise emissions is determined and multiplied by the noise quality factor (currently 8). The resulting value is subtracted from the noise surcharge based on the actual noise emissions, leading to the noise surcharge. Finally, the average noise surcharge at Vienna airport (currently EUR 14.69) is subtracted from the noise surcharge. This leads to payments from the airport to the airline, if the calculated noise surcharge is below the average noise surcharge. For example, for one movement with an A320 the airline might receive EUR 3.30 or might have to pay EUR 4.30, depending on the aircraft variant. For a B747-400 the noise surcharge is approximately EUR 14, for the older B747-200 it is above EUR 25.

4. Conclusions

Economic incentives for the use of less noisy aircraft differ significantly among European airports. Several airports, especially in Germany, have replaced the 'traditional' differentiation of movement-related charges with surcharges based on actual noise emissions. Within the group of narrow-body aircraft, however, they only provide limited incentives for further noise reduction. The recently introduced surcharge at Vienna airport shows that it is possible to combine a noise surcharge with a benchmark approach.

Whereas many airports have implemented economic incentives for noise reduction within their charging system, it remains unclear whether they are an effective instrument for environmental protection. Except for extremely noisy aircraft, which are hardly operated at larger airports, the share of the noise surcharge within the total airport charges is rather small, in most cases significantly below 10%. In order to analyse the effectiveness of surcharges from an empirical perspective, however, comprehensive data on airlines' operating costs would be necessary.

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Aviation security: an appraisal on registered travel passenger schemes in the aviation industry

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Abstract: The purpose of this paper is to provide the results of research conducted on existing registered passenger schemes in the aviation industry in order to provide an overview and comparison of selected systems used in this area. The global requirement is a revised, more comprehensive, Registered Passenger framework. The intention is to compare existing schemes and demonstrate their overall performance by taking into account pre-defined Key Performance Indicators. The outcome may produce and document meaningful recommendations for aviation organizations to begin addressing the issue of achieving travel efficiency by adopting a common, integrated passenger scheme for improving air traveller's satisfaction.

Keywords: aviation, security, Registered Traveller Passenger Schemes.

1. Overview

The purpose of this paper is to provide the results of research conducted on existing registered passenger schemes in the global aviation industry in order to provide an overview and comparison of selected Automated Border Control (ABC) systems used in this area. The intention is to start to bridge and compare existent biometric identification schemes among various aviation stakeholders and demonstrate the need for a commonly accepted and harmonized system.

As a first step, this study argues that, whilst a significant number of existing registered traveller schemes have proved successful (Graham, 2008), one of the major problems is that different aviation stakeholders across the world are unilaterally adopting different biometric schemes. The study reveals that, although there is no industry standard and there is no common consensus as to which technique is most effective, there is a need for the industry to work more together to prevent global technological fragmentation in this situation (Thorn, 2007). With the aim to produce and document meaningful recommendations to enable aviation stakeholders to begin addressing the overall problem of achieving travel operational efficiency by adopting an integrated passenger processing model, the study reviews and compares systematically various selected biometric security systems and passenger design schemes.

2. Literature Review

Aviation security has always been a significant aspect of airport and airline operations. The events of 9/11, however, sparked the emergence of additional security measures in the global aviation industry, such as the adoption by the International Civil Aviation Organization (ICAO) in 2002 of an Aviation Security Plan of Action. In addition, new mandatory security standards were agreed ranging from locking flight deck doors, removal of shoes at passenger's screening and sharing information about potential security risks (Jane's Airport Review, 2002). The United States Congress rapidly developed the Aviation and Transportation Security Act (ATSA), signed on 9 November 2001 and transferred by 2002 direct responsibility for security to the

Federal Government with the formation of the Transportation Security Administration (TSA). In 2003, however, the overall security control was assigned to the Department of Homeland Security as the only responsible agency to co-ordinate all security measures in the United States, supported by a federal workforce of 28,000 new, properly-trained staff who had a mandatory requirement to be a US citizen (Bacon, 2002). At the same time in Europe, there was a general agreement that security measures should be harmonized throughout the region and Regulation 2320/2002 came into force (European Commission, 2002). Common security rules, such as unannounced airport inspections, mandatory staff searches in restricted areas, new baggage screening methods and compulsory national security programmes are covered by this regulation. In the aftermath of all these measures, there were numerous passengers' complaints, an increased hassle factor and a significant security cost for both airlines and airports, that was putting passengers off flying or encouraging them to travel by different modes of transport (Rossiter & Dresner, 2004).

In parallel with these developments to enhance security procedures, various aviation stakeholders have begun using new types of security measures such as biometric identification. Biometrics can also be used for other processes at the airport as well as border control, something that can increase the efficiency of the process, save time and enhance customer service. Also, there is no risk of losing, copying, forgetting or having the biometrics stolen (Graham, 2008).

In 2003, ICAO also agreed to adopt a global standard biometric passport, the e-Passport, a Machine Readable Travel Document (MRTD) that has the passenger's critical information (i.e., digital facial photo and voluntary fingerprint or iris recognition) stored in a tiny computer chip. Since then, some passengers can volunteer – sometimes at a cost – to provide their personal and biometric information to be included in a 'Registered Passenger' or 'Registered Traveller' or 'Trusted Traveller' scheme. Current initiatives include Iris Recognition Immigration System (IRIS) scheme in the UK, Immigration Automated Clearance System (IACS) scheme in Singapore, PARAFES in France, Registered Traveller VISIT Programme in the USA, E-gate in UAE/Spain and Privium scheme at Schiphol Amsterdam airport (Accenture, 2010). A number of these, that are most suitable for frequent flyers have been trialled or are already operational (Graham, 2008). Table 1 shows the current worldwide Travel Passenger Schemes.

Table 1. Worldwide Travel Passenger Schemes in the Aviation Industry

Registered Travel Passenger Schemes												
Countries	Malaysia	Netherland	USA	Hong Kong	Singapore	Australia	Portugal	United Kingdom	Canada	France	United Arab Emirates	Kigali
Schemes	e-passport and e-ID	PRIVIUM	VISIT	E-Channel	e-IACS and IRIS	Smart Gate	ABC RAPID	(miSense) ABC TRIAL and IRIS	ABC	PARAFES	E-gate	APCS Automated

Passenger-profiling, where passengers of higher risk are identified through interview and behaviour pattern techniques, remained as an alternative approach and has raised from the beginning personal data protection issues and rights (ACI, 2006). Nevertheless, since 2003, the United States border control and other countries since 2006 (i.e., Canada), have required passenger name records (PNRs). In addition, advanced passenger information (API) data collected by airlines, which contain information concerning itinerary, date of birth, nationality,

gender and address in the destination country, were also required to be sent to Border Agencies in advance (Association of European Airlines, 2006).

By October 2006 (European Commission, 2006), another significant development has been the changes to the liquid, aerosols, and gels (LAGs) regulations (i.e., passengers allowed to carry on board LAGs as long as they were in containers no larger of 100ml and in clear plastic bags). Duty-free purchases could continue to be taken on board if they were in Standard Tamper-Evident Bags (STEBs) but only from an EU or European Economic Area (EEA) airport (Graham, 2008). Since such restrictions varied from country to country, ICAO in March 2007, with the aim of reducing some of the inconsistencies which existed, provided additional guidance on LAG restrictions and with details of the universal specifications for STEBs and supply chain security (Bradbrook, 2007).

In January 2008, an amendment to EC 2320/2002 draft regulation within the European Union established the principle of “one-stop security”, meaning that transfer passengers arriving from non-EU countries will no longer have to be re-screened if their security regimes are recognized by the EC to be equivalent to European standards (Falconer, 2008). To conclude with, whilst a number of these registered traveller schemes have proved successful, one of the major problems is that different aviation stakeholders across the world are unilaterally adopting different biometric schemes. Unlike with ePassports and LAG’s, there is no industry standard and there is no common consensus as to which technique is most effective (Graham, 2008).

3. Research Methodology

The global requirement is a core, more comprehensive Registered Passenger framework around which a new global security policy can be promoted, a new security culture can be adopted, new lessons from civil aviation can be learned, new biometric identification methods can be designed and existing security databases can be restructured. Nevertheless, the key research question is whether an ICAO-driven model or just a further improvement on existing security programmes will be more beneficial to both Civil Aviation/border authorities and customers (i.e., passengers) and adequate both to promote border security and decrease hassle factor among them. As a result, a number of steps were developed to break down the task.

To begin with, eight registered passenger schemes, (i.e., e-ID/My Kad, PRIVIUM, E-Channels, e-IACS, IRIS, Smart Gate, ABC RAPID, ABC TRIAL) were compared. Based on the fundamental prerequisites for the development of an effective scheme, a separate System Description for each scheme was set off the project. Concurrently, the conducted research aimed to provide a better understanding of the operating environment of the examined Travel Passenger Schemes, rooted from an extensive literature review, relevant and official data, personal investigations and Subject Matter Experts’ (SMEs’) reports, passengers’ survey results retrieved from relative Security Departments, Aviation Organizations (i.e., ICAO, IATA, ACI, AEA, FAA) and pertinent institutions. Subsequently, the study revealed for every one of the above mentioned Travel Passenger Schemes the potential Key Performance Indicators (KPIs) used to identify and explore each component’s characteristics, as shown in Table 2.

Table 2. Travel Passenger Schemes and KPIs

Countries	Malaysia, Netherland, Hong Kong, Singapore, United Kingdom, Australia, Portugal, United Kingdom
Schemes	e- passport and e-ID (My Kad), PRIVIUM, E Channels, e-IACS, IRIS, Smart Gate, ABC RAPID, ABC TRIAL
Key Performance Indicators (KPI s)	Automated Border Control (ABC) or semi ABC system, Target group, Cost, Enrolment, Biometric used, Token, Storage Biometric, Average process time, Global Interoperability.

For the purpose of this paper, ABC considered a system that automatically determines passengers’ eligibility for border crossing according to pre-defined rules. Accordingly, global inter-operability is defined as the capability of travel passenger schemes in different countries throughout the world to exchange data, to process data received from systems in other states, and to utilize the data inspection operations in their respective states. Global inter-operability is an important characteristic as it may affect the accuracy and completeness of a user’s tasks while using a travel passenger scheme, something that may also affect the overall system’s effectiveness. Therefore, inter-operability could be the major component of the standard specifications of all biometrics and Machine Readable Travel Documents (MRTDs) as it may allow passengers to trans-pass from one system to another without rejection. By using qualitative and quantitative research methods the study, on the basis of lessons learned from civil aviation, literature review, national requirements and the findings of the System Description, revealed the appraisal result of the Registered Travel Passenger schemes, as shown in Table 3.

Table 3. Appraisal Results for Registered Passenger Schemes

Countries	Malaysia	Netherland	Hong Kong	Singapore	UK	Australia	Portugal	UK	
Schemes	e-passport and e-ID	PRIVIUM	E-Channel	e-IACS	IRIS	Smart Gate	ABC RAPID	ABC TRIAL	
Key Performance Indicators (KPI s)	<i>ABC or semi ABC</i>	ABC	ABC	ABC	ABC	ABC	ABC	ABC	
	<i>Target group</i>	Malaysian Citizen	EEA & SWISS Nationals	National ID Card holders	Singapore Citizens	EEA Nationals & Frequent Travellers	Australian & New Zealand e -passport Holders	EU,EEA &CH citizens	EEA National
	<i>Cost</i>	None	Yes	None	Yes	None	None	None	None
	<i>Enrolment</i>	Yes	Yes	No	Yes	Yes	No	No	No
	<i>Biometric Used</i>	Finger Print	Iris	Finger Print	Finger Print	Iris	Face	Face	Face
	<i>Token</i>	e-Passport / e-ID	Smart Card	Smart ID Card	Passport / Smart Card	No	ICAO e-Passport	e-Passport	e-Passport
	<i>Storage biometric</i>	In e-Passport & e-ID	On Smart Card	On Chip of Smart ID Card	Backend databases	Database	On Smart chip	On Chip in Travel card	On chip in e-Passport
	<i>Average process time</i>	9-12 secs	10-15 secs	10-12 secs	12 secs	20-25 secs	30 secs	15 secs	11 secs
<i>Global Interoperability</i>	None	None	None	None	Partial (only with UK ABC TRIAL)	None	None	Partial (only with UK IRIS)	

Although, the overall system-characteristics in Table 3 seem efficient for every travel passenger scheme, the lack of interoperability with other national systems generates major concerns in the global aviation security. The existence of a condition – whereas national oriented security systems have been established for passengers travelling international – acts as a barrier for the formation of a global, commonly accepted security standard (i.e., travel passenger scheme). Although, system-efficiency at national levels may be considered satisfactory, the deficiency in inter-operability affects the worldwide effectiveness of the existing Register Travel Passenger Schemes. As an example, passengers travelling from Malaysia to USA *via* the UAE and UK do not benefit from the system’s functionality since in order to complete the task there is

a need to register with four different passenger schemes, an issue that may finally discourage the public from registering and endorsing those schemes. Nevertheless, the appraisal's results could be used as a further recommendation for a common, unified Trusted Passenger scheme for the aviation industry that encompasses the best quality characteristics adopted from comparable data provided in Table 3, excluding inter-operability that definitely needs to be revised. Such a common scheme could prove to be beneficial not only to the aviation stakeholders but also to the flying public.

4. Constraints

Without doubt, the major concern is some people's perspectives on automated monitoring systems as those raising fears for the safety of personal data. Therefore, any potential for a common scheme will be subject to a number of constraints. In an effort to surpass potential complexities, it will be beneficial to consider the following suggestions, prior to promulgation of a common Registered Passenger rule:

- a) Establish a Co-ordination Plan to set priorities, top management commitment to the project and mainly, an enforcement action necessary to ensure the availability of essential to this research information.
- b) Agree on an International Regulation for protecting security information and proprietary data against disclosure and inappropriate use.
- c) Provide an effective mechanism for progressively superseding existing barriers to automatic transit (i.e., the privacy and security concerns of travellers).

5. Conclusions

This study defended a proposal in the critical domain of aviation security, with the aim to fill gaps in existing research, to cross national boundaries and to extend understanding in a particular topic, such as Registered Passenger Scheme. So far, aviation stakeholders through various and similar concepts isolated and independently, follow a different path in order to achieve an apparently common goal. Therefore, the results may act as a foster point, in order to further improve aviation security and security culture in both aviation organizations and the flying public. For global aviation security a revised, more comprehensive Registered Passenger framework still remains as a core requirement. To this end, global inter-operability may be proved as the main characteristic that needs to be initially adjusted.

The paper's aim was to compare existing schemes among different aviation stakeholders and to examine if a commonly accepted and harmonized system can be realized by taking into account pre-defined characteristics. The outcome may produce and document meaningful recommendations for aviation stakeholders to begin addressing the overall problem of achieving travel operational efficiency, by adopting an integrated passenger processing model and contribute to a contemporary approach for addressing air travellers' satisfaction.

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Legal issues on the European Union's emission trading system

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Abstract: Including aviation in the European Union's Emissions Trading Scheme (EU ETS) is an attempt to reduce greenhouse gas (GHG) emissions and to meet the climate targets of the European Union (EU). Introducing such a system, however, unilaterally causes a serious risk of a commercial war and counter-measures. Even if the EU ETS is also a legal issue, the best solution will be achieved not in arbitration or legal action but in political and diplomatic negotiations.

Keywords: Emissions Trading Scheme, Kyōto Protocol, Chicago Convention, ECJ ruling.

1. Introduction

Aircraft engines produce emissions as they are produced by any other fossil fuel combustion. Aircraft emissions are emitted at high altitudes, however, which means a worse effect on climate change. In the fight against global warming and on reduction of greenhouse gases (GHG), the European Union extended its Emissions Trading Scheme (EU ETS) on aviation. Beginning in 2012, aviation became part of this mechanism. To meet the emission-reduction objectives the total amount of emissions is capped and allowances in the form of permits to emit CO₂ are the subject of trade between emitters. As the number of permits decrease the emitter will either pay more for the allowances or contrive ways and means to reduce their emission – the result would be technological progress and of course the reduction of climate-damaging GHG. The global increase of air traffic is left out of consideration.

2. The legal background of the EU ETS

The EU sought to achieve a global agreement on reducing GHG emission from aviation. The International Civil Aviation Organization (ICAO) failed in several attempts to establish a global policy on the reduction of GHG emissions in aviation (Selection of attempts: ICAO Council Resolution on Environmental Charges and Taxes of 9 December 1996 (C149/16); ICAO Doc. 9885; ICAO Resolution A37-19 (Doc. 9958); see Milde, 2012). Developed countries committed themselves to a reduction of GHG when negotiating the Kyōto Protocol (Kyōto Protocol to the United Nations Framework Convention on Climate Change from 1997). All other countries gave just general commitments. Anyway, at this point an inclusion of aviation to the international goal of climate control was not possible.

The reason why the Kyōto Protocol excludes emissions from international civil aviation is simply irresistible: the emissions from international civil aviation cannot be allocated to a specific country. All other industrial pollutions are localized and can be assigned to their country of origin. For aviation it is not that easy; especially after deregulation and liberalization of the international air transport this became even harder. Taking advantage of more than just the 3rd and 4th freedom right, air carriers also offer air transport for other than their nationals and on routes without links to their home countries. Traffic and expenses on emission allowances would happen in one place and the revenue for the emission allowances would occur in another

place. In the current system the air carrier pays for the allowances in its home country, no matter where the emission takes place. It is doubtful if this system meets the international goal of climate control.

Actually, today there is no legal possibility to fight GHG emissions in the aviation sector on a global scope, nor a possibility to establish a global emission trading system for aviation. The German Federal Government expects the introduction of a global emission trading scheme not before 2018 (Bundestag, 2012), but does not say how this can be reached with the existing disagreement. Only developed countries are encouraged by the Kyōto Protocol to pursue limitation or reduction of emissions of GHG not controlled by the Montreal Protocol from aviation working through the ICAO (article 2.2 of the Kyōto Protocol). The specifications of such measures are conveyed to the national authorities.

Because of the disenchantment with the failure of the international fold, the EU decided to carry out its own system for reducing GHG emission from aviation without the involvement of third countries.

The legal basis for including aviation in the EU ETS is the Directive 2008/101/EC of the European Parliament and that of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for trading greenhouse gas emission allowances within the Community. From 1 January 2012 all flights which arrive at or depart from an airport situated in the territory of a member state to which the EU Treaty applies shall be included in the EU ETS, i.e., all flights arriving at or departing from EU airports are covered, regardless of the nationality of the aircraft operator (a brief description how the EU ETS works appears in Gjemulla & Weber, 2011, p. 377 *et seq.*). The term “flight” means one flight sector, which is a flight or a series of flights which commences at a parking place of the aircraft and terminates at a parking place of the aircraft (the exceptions are listed in Annex 1 of the Directive). This includes the flight routes outside the airspace of the EU and over the high seas.

3. Legal problems – the EU ETS and international law

By all means, the current legal situation is unlawful because of three major reasons. The Directive 2008/101/EC violates international law from different points of view.

First of all the Directive violates article 1 of the Chicago Convention and the rule of sovereignty of the air determined in this article. The EU vests competence to its bodies to regulate issues not only taking place over the high seas but also in the sovereign territory of other contracting parties to the Chicago Convention. Those recognize in Article 1 of the Chicago Convention that every state has *complete and exclusive sovereignty* over the airspace above its territory. The territorial principle established hereby is a prohibitive rule (prohibitive rule according to the judgment of the Permanent Court of International Justice in the Lotus case) whereupon it is not permitted to adopt and enforce rules, which relate to matters, which have occurred on the territory of another state (Bartlik, 2011). It would be allowed to overrule this territorial principle in one certain case: Regulations regarding own nationals (in this case the so-called Community air carrier; for the legal definition see art. 2 par. 11 of the Regulation (EC) No 1008/2008 of the European Parliament and of the Council of 24 September 2008 on common rules for the operation of air services in the Community) can be adopted and enforced relating circumstances occurred on the territory of another state. Hence, creating an emission trading scheme on the basis of the principle of personal jurisdiction is allowed and imaginable, though the current mechanism includes foreign air carriers, which is strictly impossible without agreement of the opposing party.

Secondly, the Directive violates article 15 of the Chicago Convention that deals with airport and similar charges: “No fees, dues or other charges shall be imposed by any contracting State in respect solely of the right of transit over or entry into or exit from its territory of any aircraft of a contracting State or persons or property thereon.” The emission allowances and the payment for them respectively are such forbidden fees. The terms fees, dues or other charges were subject to discussion and are beyond dispute. There is a distinction between payments as a return for services or facilities. Such payments are related to the cost of such services and do not produce a general national revenue. This kind of payment is regulated in article 15 and thereby allowed under defined circumstances. By implication all other payments not related to services or facilities are forbidden under this article. It is no surprise that such kind of payment (participation in an emission trading scheme) is not regulated and therefore forbidden by the Chicago Convention, which was adopted almost 70 years ago – without the consciousness of the climate change and a global warming. Hence, adopting an emission trading scheme for third countries is not covered by this.

In the third place the EU ETS subjects developing countries and their airlines to the required emission targets an action, which is contrary to the provisions of the Kyōto Protocol. The Kyōto Protocol does not set emission targets for developing countries. So, forcing the developing countries to participate in the EU ETS would oblige these countries and their airlines with the same commitments to the reduction of GHG emissions and to the climate targets as those set for developed countries. This may not be intentional.

4. The ECJ ruling on the EU ETS Directive

For a legal review, the Court of Justice of the European Union (ECJ) was concerned with this directive in a preliminary ruling (Case C-366/10, judgment of the Court of Justice of the European Union (Grand Chamber) from 21st December 2011). In the main proceedings the action was directed against the national implementation of Directive 2008/101 by the Minister of Energy and Climate Change of the United Kingdom (a directive, according to art. 288 of the Treaty on the functioning of the European Union (TFEU), is binding for the EU member states but leaves the choice of form and methods for achieving the result to the national authorities). The plaintiffs (Air Transport Association of America, American Airlines Inc., Continental Airlines Inc. and United Airlines Inc.) challenged the validity of Directive 2008/101. Declaring acts of the European Union invalid is the privilege of the ECJ to ensure equal application of EU law across all EU member states (paragraph 47 of the judgment), so that this case had to be heard at the ECJ. The plaintiffs stated that the directive is contrary to the Chicago Convention, the Kyōto Protocol and also to the Air Transport Agreement between the EC and its member states and the United States from 30 April 2007. Furthermore, the plaintiffs contested that emission certificates must also be submitted for flights on routes outside the airspace of the EU and over the high seas.

As the Advocate General rejected all submissions of the claimants relating to general international law, it was no surprise that the ECJ rejected the claim. It stated that its “examination of Directive 2008/101 has disclosed no factor of such a kind as to affect its validity” (principle 2 of the judgment). The reasoning is that the EU is not party to the Chicago Convention and therefore – even if all its member states are party to that convention – is not bound by it. The ECJ explains that there would be just one case where the EU would be bound (as stated in paragraph 63 of the judgment): “Indeed, in order for the European Union to be capable of being bound, it must have assumed, and thus had transferred to it, all the powers

previously exercised by the member states that fall within the convention in question (see, to this effect, *Intertanko et al.*, paragraph 49, and *Bogiatzi*, paragraph 33). Therefore, the fact that one or more acts of European Union law may have the object or effect of incorporating into European Union law certain provisions that are set out in an international agreement which the European Union has not itself approved, is not sufficient for it to be incumbent upon the Court to review the legality of the act or acts of European Union law in the light of that agreement (see, to this effect, *Intertanko et al.*, paragraph 50)". Still, even if this is constant jurisdiction of the ECJ this reasoning does not convince. Of course the EU is not bound to an international treaty as a party to the treaty since the EU is not a party to the Chicago Convention, but the assumption that the EU is only bound by international law like the Chicago Convention, if its member states transfer their exercised power completely, is incorrect (paragraph 63 of the judgment; compare the judgments in the cases *International Fruit Company et al.* 21/72, *Peralta* C-379/92, *Bogiatzi*, C-301/08). The transferred power must be used with the limitation it was transferred from the member states to the EU. If the member states (and all EU member states are party to the Chicago Convention) permit the EU to exercise power in the sector of aviation (by art. 100 Treaty on the functioning of the European Union), this permission is limited by the obligation of the EU member states, e.g., prescribed by the Chicago Conventions. Even after founding the EU the obligation of the EU member states are still the same in the relationship to third countries (according to the conflict of laws as stated in art. 30 of the Vienna Convention on the Law of Treaties). Therefore it should be obvious that if the EU member states transfer their power in the sector of aviation to the EU, the EU cannot exceed this transferred power. The EU member states themselves would not be allowed to establish an emission trading scheme as the EU did. Therefore, establishing an emission trading scheme contrary to the obligations of the EU member states international law is *ultra vires*.

Renouncing the incorrect assumption would lead to a duly interpretation of the legislative power of the EU in the sector of aviation. In this case the EU would be not authorized to include aviation into the EU ETS like it was adopted.

5. Practical problems

The next serious problems will occur the first time the emissions have to be reported to the competent national authority. As European law is executed by the EU member states, the competent national authority will verify the reports and the airlines' compliance with the EU ETS Directive. It is also the EU member states' obligation to impose penalties for the infringement of the national provisions (art. 16 of the Directive 2003/87/EC). The penalty mentioned first is the publication of the name of operators and aircraft operators who are in breach of requirements. The second is that the national authority is obliged to fine the offender EUR 100 for each tonne of carbon dioxide equivalent emitted for which the operator or aircraft operator has not surrendered allowances. By paying the fine the operators or aircraft operators are not exempted to surrender the required allowances. The third possible penalty – as *ultima ratio* after enforcement measures have failed – is that the EU member state requests the EU Commission to decide on the imposition of an operating ban on the aircraft operator concerned.

There is no estimating the effect of putting the operator in the pillory. The second measure does, however, definitely have an influence on international aviation: obviously it is an obstruction to international aviation. To challenge the fine, the operators concerned can file a suit in administrative courts, as has happened in the United Kingdom (with regard to the preliminary measures of the EU ETS). The administrative court can either follow the

questionable ruling of the ECJ or pursue the rightful interpretation of international law and suspend the further implementation of the EU ETS. Hereby, the national administrative courts could give occasion to the ECJ for reconsideration its own ruling. The last measure provided for by the Directive is not just an obstruction to international aviation as imposing fines, but a completely prohibition of international aviation.

Executing the penalties is a further infringement of the ICAO system, namely the bilateral air service agreements between EU member states and third countries. Denying entry to the EU member states' airspace violates the air service agreement and is not justifiable. The EU member states probably would refer to the clause that the designated carrier (art. 5 of the German pattern agreement) should comply with the laws, regulations and procedures of either contracting party. This obligation applies to the EU legislation, too, (art. 5 para. 1 sentence 2 of the German pattern agreement), but this clause cannot be used to force a party to comply with illegitimate regulations. The obligations resulting from the internal relationship between the EU and its member states cannot have an effect on the bilateral relations to third countries. So the administrative court should decide to give up the fine and the infringement of international law. By doing this it would be possible to forward the suit to the ECJ and let it decide in a future preliminary ruling.

6. Solutions

The current legal situation and the present state of threat the world is facing cannot be carried on. Actually there are some solutions to avoid further statutory violation. As a matter of fact this can only happen through a change in the existing law, either European or international.

First of all the EU can continue the EU ETS but only for its own EU Community air carriers. As mentioned previously this would not violate the principle set in article 1 of the Chicago Convention. This would be also one of the easiest solutions, as the EU itself without the involvement of third countries could carry it out. Either the legislative bodies could adopt a new EU ETS or the ECJ could annul the current EU ETS, but limiting the EU ETS to EU Community air carriers would lead to a competitive disadvantage and an economical imbalance at the expense of the EU Community air carrier. And this is hardly what the EU would intend, namely weakening its own aviation industry. Of course the EU ETS could be suspended for aviation, so that the competitive disadvantage and an economical imbalance would not occur. After the previous actions of the EU bodies and the EU member states this appears doubtful.

As the EU pursues a global solution for reduction of GHG emissions the more favourable solution would be a revision of the Chicago Convention. This could lead to that international law would provide an option for introducing a global emission trading scheme. After almost 70 years there are different problems to challenge that the Chicago Convention cannot handle. Unfortunately the political focus is now concentrated on other economical global problems – the financial crisis. Actually this is still the best option, as the discussions for covering aviation with any emission targets belongs naturally to the ICAO.

Nevertheless there is still a possibility for a solution within the Chicago system: the settlement of disputes according to the Chapter XVIII, namely article 84 *et seq.* of the Chicago Convention. Article 84 says that if any disagreement between two or more contracting parties cannot be settled each ICAO member can invoke the ICAO Council, which has to decide about this disagreement. The concrete provisions are settled in the ICAO Rules for the Settlement of Differences (Doc 7782/2). There would even be the chance to appeal to the next higher authority, the International Court of Justice. Actually, it is doubtful if the settlement of disputes

under article 84 can solve the existing problem (Milde, 2012). There is no judicial independence in the Council as it represents the interests of the ICAO members. None of the former cases brought to the Council under Chapter XVIII were decided on the merits of the case.

Another – the very worst – option would be to terminate the Chicago Convention by all EU member states to regain unlimited legislative power in the sector of aviation for the EU. This could be suggested referring to art. 351 para. 2 TFEU, which stipulates to take all appropriate steps to eliminate the incompatibilities between EU law and other agreements under international law. As aviation is an international issue *everything* would have to be negotiated with the states where to air transport should be operated. This would akin to idiocy as the Chicago system is still working properly and the main issues of the Chicago Convention are repeated in bilateral air service agreements. So this cannot be seen as a serious solution to the EU ETS problem.

7. Conclusion

The future will show how the non-European aviation community will react on the EU ETS and if a compromise will be achievable. Unfortunately the first reactions do not sound promising.

Including aviation in the EU ETS was a political decision that had no basis in international law. As a matter of fact the EU ETS-Directive and the ECJ ruling are postulations to violate the obligations set by the customary international law and the Chicago Convention. Still, it is not possible to solve a political problem, namely the inclusion of international aviation into emission targets, by some imperfect legal approach to that problem. It will be impossible to solve a political problem just with legal approaches. Instead there has to be readiness to negotiate and to compromise to overcome this conflictive situation and the threat of economical countermeasures. Considering the possibility to settle a case to the ICAO Council would still make political negotiations necessary. The Council can only decide on the basis of existing law. Of course this cannot replace a political decision to renew the Chicago system and bring it to current needs. Only this can help over the disenchantment with the failure of the international fold to include aviation in global emission targets. So the ICAO should still be the forum through which to resolve all technical issues relating to the environment.

This will be the possibility for the aviation industry and for lawyers to influence the outcome, to meet the needs of the aviation industry as well as environmental needs. Still, the question is whether a global emission trading system would really reduce GHG emissions. A steadily increasing aviation industry will have to find other solutions to reduce GHG emissions since paying for them won't reduce the GHG emissions. It is the technical development and the use of sustainable alternative fuels that will help to meet the climate targets.

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Emirates Airline’s contribution to the connectivity of German airports and its impacts on passenger flows to Asia

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Abstract: Our paper summarizes the results of a study on the economic benefits of Emirates’ flights to Germany in the areas of connectivity and impacts of new air services on passenger flows. We assess Emirates’ contribution to connectivity with key performance metrics, such as the number of weekly connections from Germany to Asia. We evaluate demand effects, such as traffic generation and impacts on transfer passenger flows, based on Sabre ADI data. We find that Emirates’ flights are particularly beneficial for the connectivity of secondary airports. Incumbent carriers still capture a substantial share of demand and continue to grow despite new competition.

Keywords: air transport liberalization, traffic rights, Emirates Airline, airline competition, air transport demand.

1. Introduction

Since 1987, Emirates Airline has operated flights from Dubai to Germany. As of July 2012, the Dubai-based carrier serves four points in Germany with a total of nine daily passenger flights to and from Dubai. Additionally, Frankfurt and Düsseldorf are served regularly with freighters. With Berlin and Stuttgart, the airline seeks to serve two additional points in Germany. The current bilateral air services agreement between Germany and the United Arab Emirates limits passenger services to only four points, however. In this paper, we examine the effects on connectivity and passenger flows coming from the provision and use of existing and potential new passenger flights.

2. Connectivity

Connectivity has become one of the most important location factors in times of globalization. Numerous studies (e.g., Button & Taylor, 2000; Santin, 2000; Harsche *et al.*, 2008) have shown that accessibility by air transport has a wide range of regional economic effects, including an increase in foreign direct investment, job creation and an increase in incoming tourism. Connectivity can be measured, for instance, by the number of destinations that can be reached, the number of flight segments required to reach these destinations or the number of weekly flight frequencies.

An important measurement of connectivity is the number of weekly frequencies being offered at an airport. With more frequencies available to passengers and shippers of air cargo, “schedule delay”, i.e., the difference between published and preferred departure time, can be reduced. Moreover, choice for passengers concerning service quality and fares increases, when several airlines offer connections between the same city pairs. For the evaluation of weekly flight frequencies, a tool was developed, which is based on OAG schedules data. It provides as output the number of weekly flight connections, along with other parameters, such as the number of

required flight legs (transfers) to reach destinations and the total travel times by airport and/or airline.

Figure 1 shows the weekly number of non-stop and one-stop itineraries from Frankfurt, Munich, Düsseldorf, Hamburg, Berlin and Stuttgart to the 100 largest airports in the Eastern Hemisphere (Asia, Middle East, Southern and East Africa and South-West Pacific), offered by the 10 airlines, which in total offer the highest number of non-stop and one-stop connections from the six German airports under consideration.

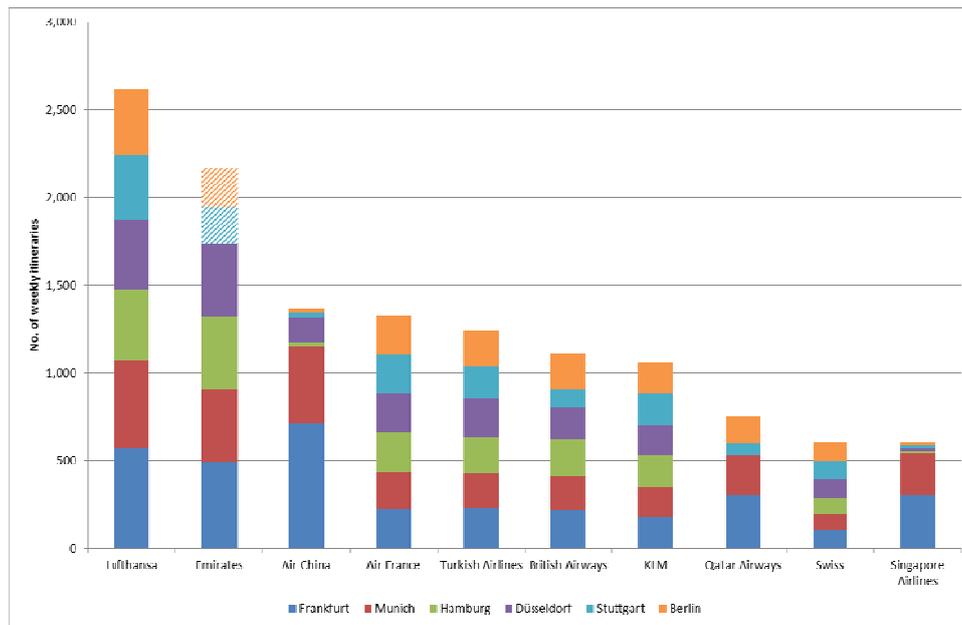


Figure 1. Number of weekly itineraries to the 100 largest airports in the Eastern Hemisphere from selected German airports by airline.

Source: own illustration based on data provided by OAG.

The analysis shows that Lufthansa offers the highest number of weekly non-stop or one-stop itineraries, with more than 2,600 non-stop and connection services. Emirates comes second, with more than 1,700 itineraries in the 2011/12 winter schedule period. In case Emirates will be allowed to operate a daily flight from Stuttgart and Berlin, this could increase to almost 2,200. For Stuttgart and Berlin, we have assumed hypothetical flight schedules with daily departure times at 3:20 pm and arrivals at 11:35 pm in Dubai. For Stuttgart and Berlin, respectively, a daily Emirates flight to Dubai could create 217 additional weekly flight connections, i.e., seven non-stop flights to Dubai and 210 onward connections from Dubai in Emirates' network.

As Lufthansa has a broad domestic feeder network and basically every long-haul flight from Frankfurt and Munich can be reached from any other German airport, Lufthansa's number of connections offered is relatively high for each German airport (368 from Stuttgart, 380 from Berlin, 399 from Düsseldorf and 403 from Hamburg). From Frankfurt, the German carrier offers 574 weekly connections. This includes Lufthansa-operated non-stop flights, one-stop connections within the Lufthansa network (e.g., *via* Munich) and code-share connections, where one flight is operated by Lufthansa.

In terms of travel times, Lufthansa remains on nearly all city pairs between Germany and the Eastern Hemisphere the carrier with the shortest journey times. This is due to a combination of the high number of frequencies from Germany's secondary airports to the hubs in Frankfurt and Munich and the low detour factor. Based on these findings, we form the hypothesis that Lufthansa and Emirates operate to a large extent in two separate markets. Lufthansa is particularly strong in the area of high-yield business travel, where passengers place a high value on time. Emirates, in turn, stimulates the market with added capacities and competes for less time-sensitive travellers against airlines with similar business models such as Etihad Airways, Qatar Airways or Turkish Airlines.

3. Passenger flows

A major issue in the public discussion on the extension of traffic rights for Emirates is the impact the carrier has on passenger flows. Some stakeholders fear that increasing competition will reduce the volume of transfer passengers handled at German hubs, as passengers from secondary airports may use other alternatives. This section therefore analyses empirical data of the impacts Emirates and other Gulf carriers had on passenger flows from German airports to destinations in Southern and East Africa, Asia, the Middle East or the South West Pacific up to the year 2010.

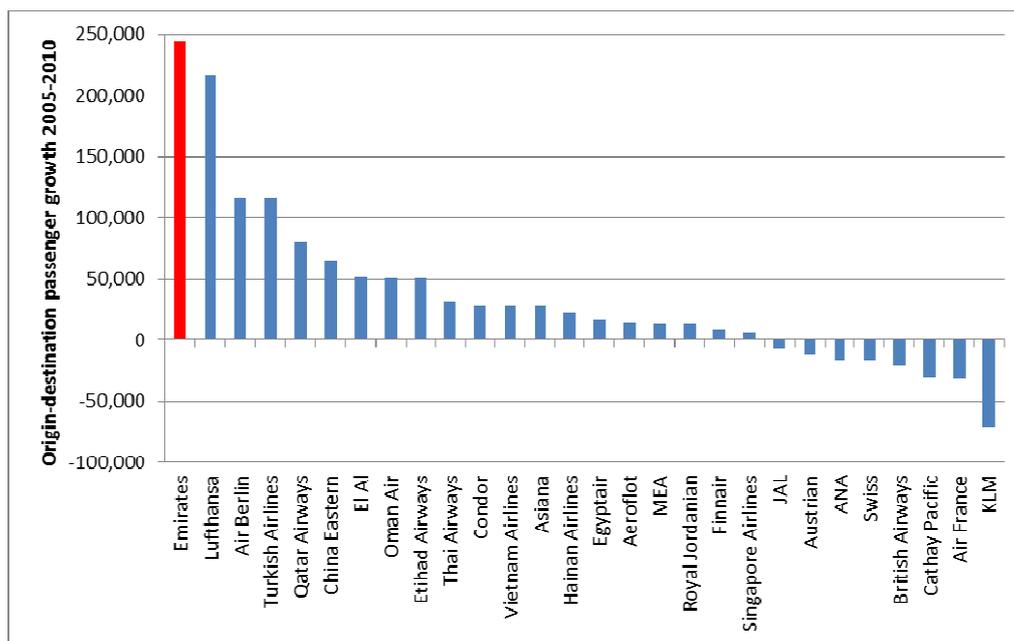


Figure 2. Origin-destination passenger growth by individual carriers in the market between Germany and South & East Africa, Asia, the Middle East and the South-West Pacific between 2005 and 2010.

Source: own representation based on data supplied by ADI.

According to data provided by Sabre ADI, the number of origin-destination passengers travelling from Germany to a destination in the Eastern Hemisphere increased from 4.3 million in 2005 to 5.6 million in 2010. Figure 2 highlights which carriers have participated in the

absolute growth of 1.3 million passengers. The analysis includes origin-destination passengers which used a non-stop flight from Germany or an online connection (i.e., transferring between two flights of the same carrier) on the first two flight segments of their journeys.

Emirates has the highest growth in absolute passenger numbers, with about +250,000. Second highest growth was achieved by Lufthansa with +220,000 passengers, followed by Air Berlin and Turkish Airlines with a growth of +116,000 passengers each. This analysis shows that Emirates has captured less than 20% of the growth of the Germany-Africa/Asia/Middle East/Pacific market between 2005 and 2010. The figure also shows the airlines which have declining passenger numbers. In the first place, we see traditional European network carriers, which have declined in the German market. Among these are Austrian Airlines, Swiss, Air France-KLM and British Airways. It is reasonable to assume that travellers bound for Asia from Germany prefer the offers from new entrants, which have established themselves as carriers with a relatively high service quality and value for money.

The development of the aviation market between Germany and the Eastern Hemisphere can also be shown in relative terms. Figure 3 represents the indexed development of originating passengers between Germany and the Eastern Hemisphere between 2002 and 2010 (2002 = 100).

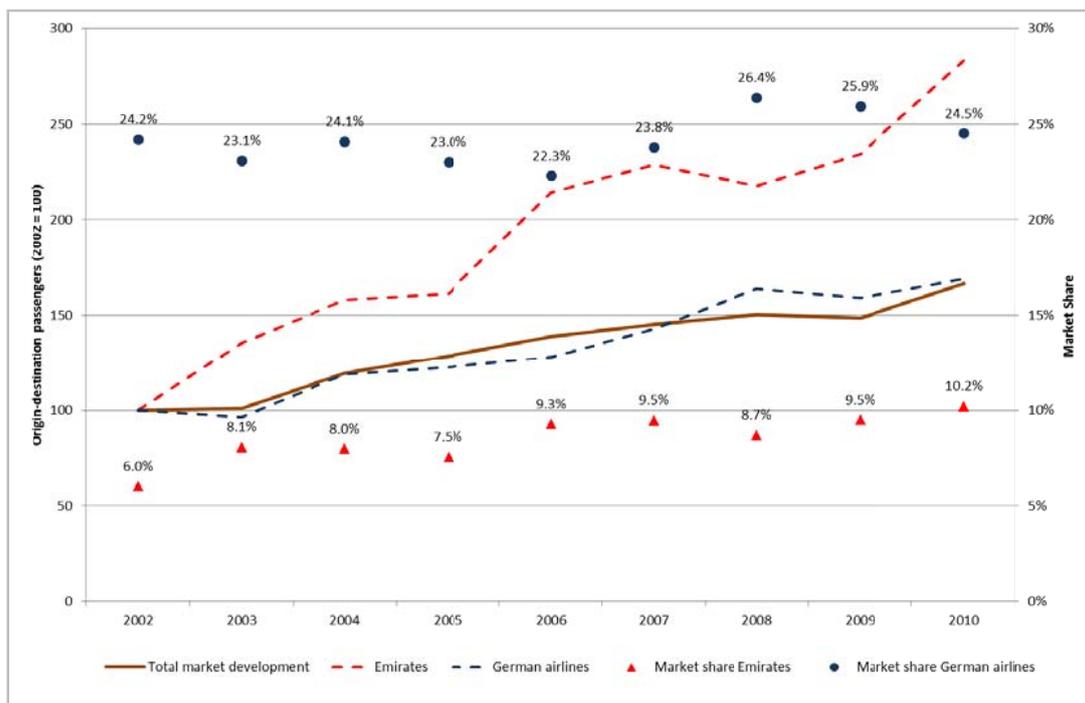


Figure 3. Origin-destination passengers from Germany to South & East Africa, Asia, the Middle East and the South-West Pacific between 2002 and 2010 in relative terms.

Source: own representation based on data supplied by ADI.

The overall market has increased by about 70% in eight years. For comparison, the indexed development of Emirates (EK, red dashed line) and German airlines (primarily Lufthansa, Air Berlin/LTU and Condor; dark blue dashed line) is displayed. Here the market development as a

whole (dark red solid line) serves as a benchmark. The average market growth was 6.6% *per* year (compounded annual growth rate, CAGR). In comparison, Emirates' passenger numbers have grown by 13.9% (CAGR), but also the growth of German airlines was slightly above market average with 6.8% (CAGR).

German airlines have defended, respectively, slightly increased their market share. Over the total period, German airlines' market share increased from 24.2% in 2002 to 24.5% in 2010, whereas the market share in 2010 was 1.5 percentage points higher than in 2005. The average market share of Emirates between 2002 and 2010 increased from 6.0% to 10.2%. From the data shown we conclude that a wide range of airlines have benefited from the growing market in Germany, with Emirates and Lufthansa as the two main beneficiaries of this development.

Even in markets particularly exposed to competition with new entrants, like the Middle East and India, market leader Lufthansa has continued to grow substantially in terms of seat capacities offered. OAG data show that between 2003 and 2011, the number of seats offered between Germany and the Middle East and India increased from 134,000 to 217,000 *per* month and also destinations offered grew from 15 in 2003 to 21 in 2011.

4. Conclusions

The analysis of passenger development shows that Emirates stimulates the demand for trips between Germany and the Eastern Hemisphere. From this it can be concluded that passengers travelling on Emirates represent to a large extent additional demand, which has not been shifted away from other airlines or hubs. Based on the market analyses, we form the hypothesis that different market segments have evolved over the past years. On the one hand, time-sensitive travellers from Frankfurt and Munich continue to fly on non-stop services to Asia and passengers from secondary airports in Germany continue to use connections *via* Frankfurt and Munich, which often have the shortest travel times compared to competing transfer itineraries. On the other hand, price-sensitive passengers prefer the offers of new entrants, with slightly longer travel times, but a competitive offer concerning value for money. Overall, the growth of airlines like Emirates has not led to a reduction of existing non-stop/direct services of German carriers. On the contrary, the accessibility of Germany has improved due to the new offers.

With the findings presented here that transfer traffic has not shifted from German airports due to the offers of new entrants, previous hypotheses on the impacts of new competition in long-haul markets (e.g., Brützel, 2006; Grimme, 2011) can widely be confirmed. Incumbents can retain market shares in the high-yield market segment, where passengers place a high value on time, a strong preference for non-stop flights and are locked-in through frequent-flyer programmes.

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The demographic characteristics of international air travellers in developing countries: the case of Nigeria

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Abstract: There has been significant and consistent growth in international air transport markets in developing countries according to IATA. As a result many international carriers are penetrating the market despite the challenges such as entry regulation. There is a need, however, to appreciate the nature of demand of such travellers in order for airlines and policy makers to meet their needs. This paper determines and analyses the unique features of international travellers in Nigeria using a conventional survey research approach. The results indicate some significant deviation from travellers in developed countries and suggest the need for alternative airline and policy approaches.

Keywords: demand, passenger, airlines.

1. Introduction

Demographic profiling is essentially an exercise in making generalizations about a group of people. It is aggregate and probabilistic information on characteristics of a population such as passengers which cover age, nationality, and employment status. Both the trend and distribution of values within a demographic variable of interest have wide applications to air transport for policy making and airline marketing and product planning.

The importance of marketing in air transport cannot be overemphasized, however. Doganis (1985) described marketing as a linchpin of the aviation industry that matches the controllable supply of the air services with the uncontrollable demand profitably. A mismatch of markets can lead to a catastrophic outcome such as the production of the Concorde aircraft.

Furthermore, Kotler (1990) added that effective marketing planning starts with identification of market segments that can be served profitably. This requires specific market research of current and prospective passengers. The objectives of this study include understanding the demographic profile of each segment that exists in the market with a view to determining their needs, and to be able to forecast demand in each segment.

Many studies have been carried out by various stakeholders in developed countries where demographic profiles of the international passengers were established. Nigeria's international air passenger demographics are, however, relatively unknown.

2. Literature review

Doganis (2008) identified four folds of different market segments: namely business, leisure, visiting friends and relatives (VFR) and others. Understanding the size and the characteristic of each market segment on each route is significant for forecasting demand and service planning. Airlines that neglect to appreciate their market segments are likely to plunge into difficulties when matching supply with demand.

The elasticity of demand of each market segment is significantly different, which means each segment reacts differently to price and frequency variation. Business travellers are generally inelastic while leisure travellers are typically highly elastic (Vasign *et al.*, 2008).

The pattern of air travel in the early days of commercial international flight was dominated by Business travellers, with few leisure passengers. Due, however, to the expansion of passenger numbers as a result of steady increases in personnel income and decreases in the real cost of air fares, the ratio of business to leisure passengers declined. In 1985, the European market had at most 20% of the market made up of business passengers while in the USA business passengers accounted for around 25% (Blake 1989 cited in Doganis 1985).

Business Monitor (1989) discovered that out of 21 million UK residents that travel abroad by air, only 15.3% were business trips while 72.5% were holiday passengers and 10.4% were for visiting friends and relatives.

Globally, the ratio between business, holiday, VFR and others trips vary according to region and personal disposal income. Accordingly, high income countries have more leisure travellers than business travellers, whereas low income countries such as African countries, have more business trips (Doganis, 2008).

3. Methodology

The data presented were summarized from a survey of a sample of 600 international passengers conducted in 2011 at Lagos and Abuja International Airports in Nigeria. These two airports account for about 90% of Nigeria's international traffic totalling over three million passengers in 2010 (NCAA 2010). The two days' survey was carried out in the months of May and November, so as to understand the pattern based on the period of the year. A random sample from a pool of checked-in passengers that cut across all routes was selected.

4. Results and findings

The results of the survey show the demographic characteristics and pattern of travellers covering passengers' nationality, country of residence, age group, occupation, income level, journey profile, route travelled, airlines, journey purpose, frequency of trips, and rationale for choosing airline.

4.1 Nationalities of the passengers

From the total of 600 questionnaires, only 511 passengers responded to the nationality enquiries where 315 of them, representing 61.64% of the total, were Nigerian (see Table 1). Sixty-six were from other West African countries that were in transit for intercontinental traffic. This was because Lagos international airport with a good level of connectivity acts as a hub for West African travellers. This was facilitated by the provision that West African nationals do not require a visa to enter Nigeria by ECOWAS charter.

Furthermore, passengers from other African nations totalled about 13.69% of the sample (70 passengers). Most of them were on business missions to Nigeria or other West African countries. Among the passengers were 24 European nationals (4.69%) most of them being on business missions to Nigeria. Also the extent of multinational corporations involved in oil and gas exploration may have provided bases for such nationals' frequency of visits to Nigeria.

Table 1. Survey in 2011

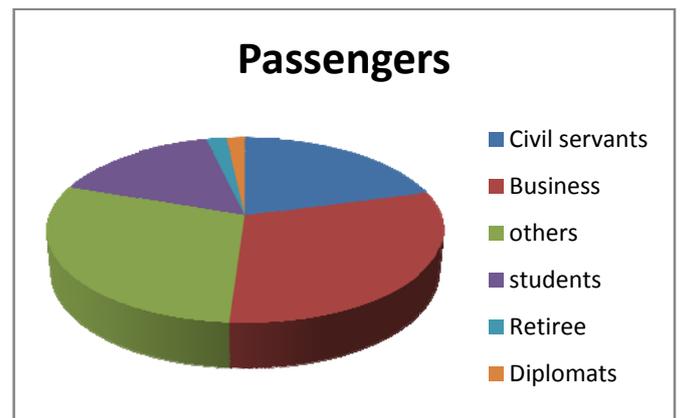
<i>Nationals</i>	<i>Passengers</i>	<i>%</i>
Nigerian	315	61.64
Other W/A	66	12.92
Other	70	13.69
African		
European	24	4.69
Asian	14	2.74
Americans	13	2.54
Lebanese	8	1.56
Total	511	100

4.2 Occupations of passengers

The occupational engagement of the international passengers from a sample of 521 indicated that business/entrepreneurs constitute 30.32% with 158 passengers in number (see Table 2 and its associated pie-chart).

Table 2. Survey in 2011

<i>Occupation</i>	<i>Passengers</i>	<i>%</i>
Business	158	30.32
Others	153	29.37
Civil servants	108	20.73
Students	83	15.93
Retirees	10	1.92
Diplomats	9	1.73
Total	521	100



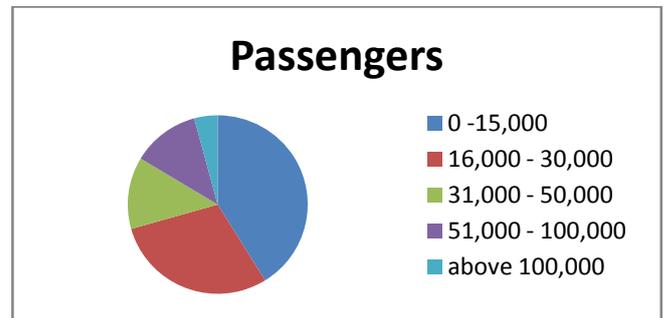
It therefore means that substantial proportions of the passengers were businessmen and women, civil servants, students and others constituted 96.35% of the distributions. This also confirms the dominance of working class in the configuration of the international passengers.

4.3 Income level

Passenger income is a very significant factor in determining the demand of air transport (Vasign, *et al.*, 2008). Table 3 and its associated pie-chart show that a substantial proportion of the passengers (70%) earn below USD 31,000 *per annum* while only about 4.2% were higher-income passengers earning above USD 100,000 *per annum*.

Table 3. Survey in 2011.

<i>Annual Income level (USD)</i>	<i>Passengers</i>	<i>%</i>
0 -15,000	98	41.17
16,000 - 30,000	70	29.41
31,000 - 50,000	31	13.03
51,000 - 100,000	29	12.85
above 100,000	10	4.2



4.4 Purpose of Journey in Relation to Nationality

About 342 of passengers representing 74.83% were business travellers. Most of them were on official assignment, or business trip, or pursuing education/training or for religious pilgrimage, while only 115 passengers (25.17%) were visiting friend/relations or on leisure, with the majority of them Nigerian in Diaspora on visiting friend/relations. (See Table 4.)

Table 4. Survey in 2011.

<i>Nationality</i>	<i>Purpose of Trip</i>			<i>Total</i>
	<i>Business</i>	<i>Leisure/VFR</i>	<i>Not stated</i>	
Nigerian	215	70	30	315
Other W/African	36	20	10	66
Other Africans	38	22	10	70
European	22	1	1	24
Asian	14	0	0	14
American	13	0	0	13
Lebanese	4	2	2	8
Total	342	115	53	510

This table shows that international passengers in this survey in 2011 in Nigeria were dominated by business travellers, which means that they are 'price inelastic'.

5. Conclusion

The result shows the pattern of travellers in developing countries differ significantly from those in developed economies. In developing country like Nigeria, business travellers seem to dominate passenger traffic while in developed countries leisure travellers dominate passenger traffic. The majority of travellers are also Nigerian which indicates that the economy is not attracting enough foreign tourists. Understanding the purpose of passengers' trips is significant information that airlines require for planning purposes and market segmentation.

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Customer perception of airline distribution channels in Nigeria

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Abstract: Competition in the airline industry, the frequent rises in fuel cost, and the recent international economic situation have necessitated the need for airlines to explore new means for generating additional revenue and reduce cost, in order to ensure profitability and sustainability. To guarantee a substantial market share, major airlines have been utilizing multiple services and product distribution channels that include the airlines' own retail offices, travel agencies, and direct online sales. Imperatively, airlines' distribution strategies should be assessed and evaluated to identify and promote the optimum channel(s). This study examines the distribution channels adopted by airlines in Nigeria, by analysing primary and secondary data obtained from airline customers, travel agency owners, regulatory bodies, and airline managers. The study shows the "direct online sales" as the optimum distribution channel. The study also highlights the challenges that airlines have to overcome to maximize revenue contribution through online sales.

Keywords: airline distribution channels, optimum distribution channel, airlines' distribution challenges.

1. Introduction

One of the core activities of any commercial airline is to sell and market its air transport services and products. As such, the availability of various customer-friendly and effective services and product distribution channels to satisfactorily cater for the target market plays a significant role in the attainment of the airline marketing objectives (Kotler & Armstrong, 2007). In today's commercial aviation industry, airline services/products are offered to customers mainly through three channels: airline ticket offices, sales intermediates (travel/tour agencies) and direct online sales (e-commerce). While the first two are "traditional" channels that have developed well over the years, e-commerce is becoming the trend for doing business. According to Butler & Keller (1998), since the deregulation of the airline industry in 1978, airline customers have preferred travel agents, who control about 80% of the market for airline ticket sales, as a channel for selling airlines services and products. Nevertheless, in today's world business environment, with the emergence of electronic commerce and growth in information technology, the airline distribution strategies are undergoing a new paradigm shift in the global market by having an additional sales channel. This is particularly encouraging due to the multi-faceted advantages that e-commerce has to offer in terms of customer service and reduction in the distribution costs (Barnes & Hunt, 2003).

There are, however, challenges that are limiting the growth of direct online sales for airlines' products. These may include lack of infrastructural facilities such as poor internet and computer technology penetration, logistics limitations such as the development of the e-banking sector to offer a secured online credit card form of payment and increase consumer level of awareness as well as develop trust in purchasing airline products online.

Chiemeke *et al.* (2006) conducted an empirical investigation on the adoption of e-banking in Nigeria. The study identified the major inhibiting factors to Internet banking adoption in

Nigeria, such as insecurity, inadequate operational facilities including telecommunications facilities and electricity supply, and made recommendations on how Nigerian banks can narrow the digital divide. Similarly, Agboola (2006) investigated electronic payment systems and tele-banking services in Nigeria. The findings revealed that there has been a very modest move away from cash. Payments are now being automated and absolute volumes of cash transactions have declined. The result of the study revealed that tele-banking is capable of broadening the customer relationship, retaining customers' loyalty and enabling banks to gain a commanding height of market share if their attendant problems, such as ineffectiveness of telecommunications services, epileptic supply of power, high cost, fear of fraudulent practices and lack of facilities necessary for their operation were taken care of.

This paper presents the findings of an in-depth study aimed at analysing the various distribution channels adopted by airlines in Nigeria to identify the optimal channel(s) as well as any challenges associated with its growth.

2. Airline distribution channels

Airline distribution channels are one of the four pillars of airline marketing strategies that facilitate marketing and sales activities to achieve the airline marketing objectives. Therefore product distribution marketing strategy, of airlines, aid to get in touch with the airline customer either directly with or indirectly through sales intermediaries to furnish information related to the airline products and conclude sales deals between customers and the airline. According to Belobaba *et al.* (2009), these channels are the means for airlines to perform passenger flight reservation and ticket sales. Thus, having an optimal distribution channel(s) that match market requirements and suit customers' preferences and position is vital for an airline to be competitive in the market and earn a better market share.

3. Airlines' distribution channels in Nigeria

In line with Legesse (2011), in Nigeria, airlines use airline ticket office, IATA-accredited and non-IATA travel agents and/or airline website. Primarily, airlines need their own retail office as a backup for travel agents, in case of technical assistance requirement, etc. At present, more than 450 IATA-accredited travel agents and over 200 non-IATA travel agents exist in Nigeria. All are serving as sales intermediaries for commercial airlines based on sales commission payment from the air fare or through service charge (mark-up) collection from the customer. These travel agents are considered as indirect distribution channels for airlines while an airline's own sales office and online service *via* website(s) represent direct sales channels.

4. Research approach and limitations

A combination of primary and secondary data sources were used for this study. The primary data sources comprised quantitative and qualitative research methods while the secondary data were obtained by examining related literature. The research design was formed based on the nature of the data collected using survey sampling techniques, questionnaires, and interviews for primary data sourcing to offer empirical claims and recommendations (White, 2002). The survey questionnaires were designed to offer close-ended questions with preconceived multiple options. In line with Legesse (2011), five sets of self-completion long questionnaires were administered to respondents based on their status in commercial airline sales and market systems. These are:

1. **Airline retail office customers:** aimed at eliciting the individual customer's position on other forms of distribution channels and their views on convenient channels for future development.
2. **Airline airport office customers:** aimed at obtaining individual customers' positions on the airline service/product distribution channels and have their views on convenient channels.
3. **Travel agencies' customers:** is focussed on the airline customers from travel agents' offices to obtain their views on airline distribution channels.
4. **On-line customers:** probed as to what extent the customer knows about the distribution of airlines services and products, the ease of transformation of products, pricing and customer relationships online. Also assessments of confidence on online channel.
5. **Travel agency owners:** is focussed on marketing and sales issues administered to determine travel agency owners' view on commercial airlines operating to and from Nigeria, the services and product distribution means of service delivery with emphasis on airlines' use of on-line distribution channels.

The rationale behind this was to ensure a representative sample and opinions of the different actors in the Nigerian airline market. The data are weighted to reflect real-life customer satisfaction statistics of airline customers in terms of distribution channels. Weighting is done by customer age, career, purpose of travel, class of travel, choice of distribution channel and satisfaction of expectation, etc. A survey of the opinions, views, indicators and reactions is obtained through distribution of questionnaires randomly on a continuous basis and interviews.

The questionnaires were designed in a way to provide the researcher with data about various aspects of the critical issues to be explored and aimed to arrive at conclusions from the discussion with the following in mind:

- Analytical report on airline distribution channels and ratios by point of sale and by channels and by product type.
- Identify and make recommendations to mitigate elements/factors that impede against efficient airline product distribution system.
- Identify and make suggestions on how to ensure airline distribution systems in Nigeria meet global standards.
- Make recommendations on how airlines in Nigeria can offer better customer service in a cost effective way.
- Suggest ways to balance impact of an airline's shift in distribution channels trend.

On the other hand, 'Interview Questionnaires and Face-to-Face Discussions' were made with industry professionals and regulatory authority officials in the field of airline distributions strategies; each administered to the key actors in the airline services/product distribution activities. The objective of the interview was to fairly obtain greater insights into airlines' current distribution strategies and to have a glimpse of airlines' attitude and belief on the optimal distribution channel and probable future strategies. The interview questions were open-ended to allow for respondents' unrestricted opinions. This was intended to complement the close-ended survey questionnaires.

The research approach was designed in a systematic way such that scientifically-justifiable claims could be made, and the outcome reflects reality on the ground. The points below are identified as some of its limitations:

- The study was limited to Lagos city alone and adopted an accidental sampling method which may have restricted customers coming from other parts of the country; hence their views may have not been reflected by the research.
- The sample size is relatively small compared to the actual data records.
- The study has not measured all major or intervening variables possibly affecting the cost-profitability nexus of any airline market distribution channels.

Consequently, this study leaves ample room for further investigation on the impact of online airline product distribution in Nigeria as e-commerce is inconclusive especially in developing economies. The findings will, however, contribute to the bank of existing knowledge and serve as an open ground for more research in the area of airlines' online distribution in Nigeria.

5. Data analysis

Since the questionnaire was mainly designed with multiple choice options, some of the answer options were designed in an ordinal ranking method. For this purpose, the five-point Likert scale multiple options in the order of: Very poor, Poor, Fair, Good, Very good, was adopted. These options were then coded in the ascending order as: 1, 2, 3, 4, 5. The purpose of this was to assign an appropriate weight to each response in order to ensure accurate measure in the degree of respondents' response to individual variable measure in the study. Finally, the 'Statistical Package for Social Sciences' (SPSS) software was used for data capturing and to analyse basic percentages, cross-tabulations, and comparing of means.

5.1 Customers' awareness of airlines' distribution channels

According to Legesse (2011), clients of the sample airline were measured on the level of awareness of the airline's different sales channels of distribution used in Nigeria. On aggregate, the majority of airline customers were aware of the airport, town and travel agents' office as airline distribution channels. Of the total number of airline customers surveyed, 25% of them claimed to be aware of the airline's airport office while 22% also indicated their awareness of town office, but only 5% of those who responded were aware of the online channel (Figure 1).

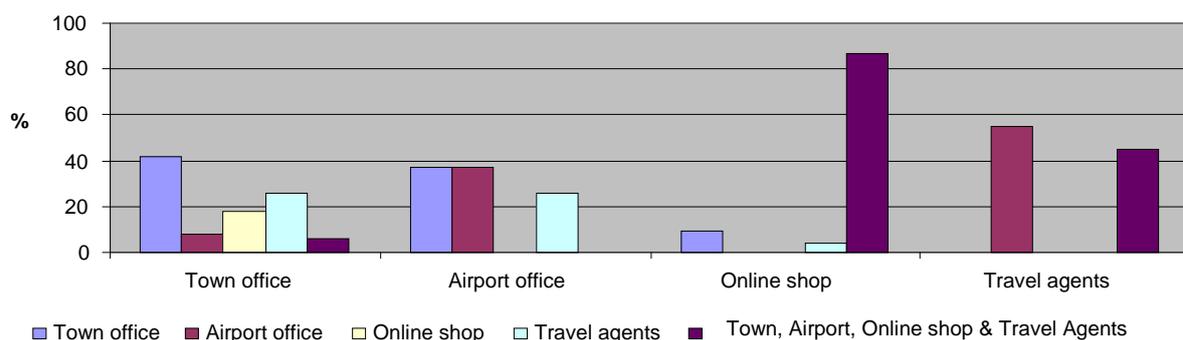


Figure 1. Customer awareness of airlines' distribution channels

5.2 Customers' perception of airlines' distribution channels

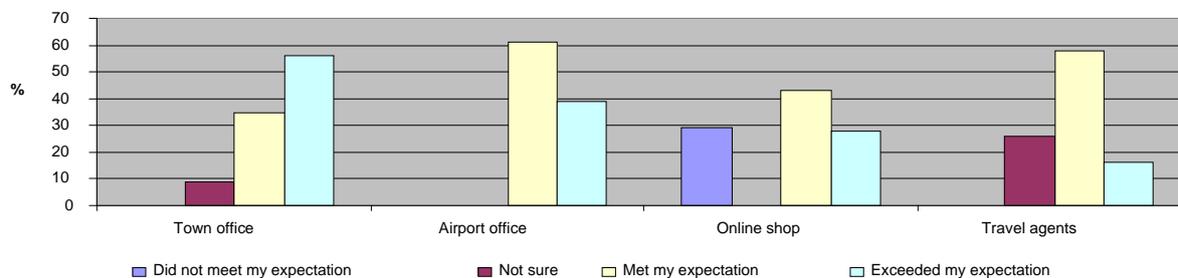


Figure 2. Customer perception of airlines' distribution channels.

From their experiences, customers of airlines have described the efficiency of the sample airlines' distribution channels in Nigeria. Specifically, 7% of the respondents were content with the efficiency of Nigeria's airline distribution channels, while 9% of respondents are not sure, leaving the two other categories of grading, 49% and 35%, who indicated efficient and very efficient performance of airline's distribution channels in Nigeria (Figure 2). Further review of the unsatisfied clients revealed that all are from the services at 'online' channels, while the majority of 'not sure' are from the 'travel agents' channel. Though, even at an aggregate, the clients who viewed services at the direct town and airport sales channels as efficient, are significant in proportion, those who rated as 'met expectations' are equally critical for consideration for improved services in relation to the airline business implications as such level of confidence may inspire customers' decision to seek alternative (better) sales channels (see Table 1).

Table 1. Nigeria airlines' distribution channel and sample airline customer service level expectation satisfaction.

Respondent	No. of Respondents	%
Did not meet my expectation	29	7%
Not sure	35	9%
Met my expectation	197	49%
Exceeded my expectation	139	35%
Total	400	100

5.3 Incentives for using the distribution channel of choice

Contrary to the majority's opinion on the efficiency of airline distribution channels in Nigeria, which was mainly rated as 'met expectation', a significant percentage of the customers described 'service' as the key incentive for processing their travel arrangement through the channels they chose. Precisely 58% fall within that category. Only 13% of them specified 'price' as the major incentive for them, while 11% indicated 'proximity' as the key incentive, and 18% of them could not say exactly what the incentives were for choosing distribution channels. Although 58%

described ‘service’ or efficiency in services as main incentives for choice among airline distribution channels, the level of service clients’ expectation of approval are considering the associated value added service offered such as credit sales, travel document arrangement including destination country visa processing and the convenience of delivery tickets at the passenger’s doorstep. Further comparison of ratings distribution channel incentive revealed that, the fact that the majority (37%) respondents’ choice of travel agent gave as have used travel agent channel as first choice based on the value added service rendered.

Concerning related ‘information’ on products of the airline through the distribution channels customers used, the general observation is that a larger proportion of the customers found useful information *via* the distribution channels of their choice. Graduating this observation by distribution channel used by the customers, however, showed that of all the channels customers graded with good and very good rating, ‘airline retail office’ the highest graded.

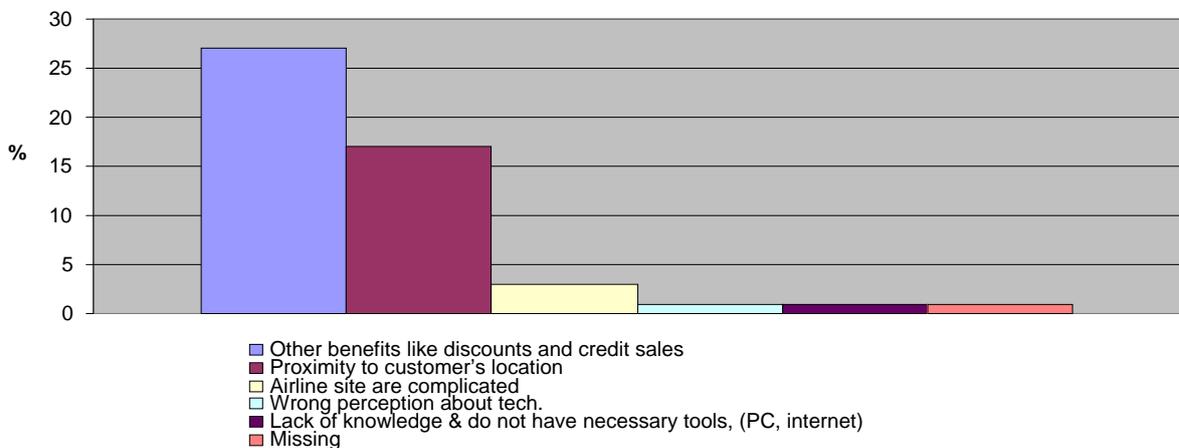


Figure 3. Customer reasons for choice of travel agents channel

5.4 Assessment of on-line services

The key focus of the study is an evaluation of on-line service as a distribution channel in Nigeria. Technically, this was a comparative assessment of Nigeria’s e-commerce especially in terms of high-tech channels and hence this part of the investigation was initiated to test customers’ opinion of airlines’ online channels, in Nigeria. Starting with Nigeria, 46% of the customers did not attempt to grade Nigeria (no comment). While 18% rated Nigeria’s e-commerce as average, 19% and 17%, respectively, graded Nigeria as below average and low. Most of the customers’ justification was that they did not trust Nigeria’s online security. In statistical detail, findings showed that 43% considered Nigeria’s online security as low while another 29% described it as below average.

On the other hand and with regard to the customers’ knowledge of online portals, 82% of respondents did not know that discounts are offered for on-line transactions, only 18% claimed to have been aware of the airline’s incentives for on-line transactions. Concerning the speed of the airline’s on-line link, all the customers indicated that high speed is important. Particularly, 48% of the respondents described it as important while 52% claimed that it is very important. Also, the speed of downloading has been indicated as a key element which the respondents noted

Table 2. Evaluation of on-line service as a distribution channel in Nigeria.

Respondents	Low	Below Average	Average	No comment	Total
Town office	32	32	14	22	100
Airport office	41	26	8	25	100
Online Shop	0	11	15	74	100
Travel agents	0	10	38	52	100
Total	73	79	75	173	400

as important. In this regard, over 60% claimed that the speed of downloading is important while the remaining 40% described it as very important. In general, unlike their low rating of Nigeria's on-line services and security, a significant number of the respondents (67%) claimed that they were satisfied with the level of online service. According to the majority of the travel agents owners' views, 56% suspect that airline customers rarely use on-line services because of benefits like discounts and credit sales which are on offer. Another 34% perceived this as a function of their proximity to their customers. Others give reasons such as complexity of airline site, customers' wrong notion on the technology, and customers' lack of necessary tools (personal computer and internet access).

6. Conclusion

In summary, the observation from this study is that each of the distribution channels has its own appeal to airline customers as well as its limit in terms of effectiveness in service delivery. Overall, the 'airline retail office' as a form of distribution channel is preferred by the respondents of this study over any other channels. Nevertheless, a significant percentage of the respondents use travel agencies to procure their travel tickets in Nigeria. Indeed, many of the them did not indicate on-line portal as their most-used medium and a very small fraction had used the on-line portal as an alternative channel to the one they used most recently, during the time of this study. The observation that bears the implication of customers' preference for travel agents which significantly remains the respondents' choice, with high level of patronage, becomes better appreciated considering the fact that the majority of the respondents were aware of the services of travel agents which definitely marks up their clientele base. The overall implication is that travel agents are critical service channels for airlines' customers in Nigeria.

The competitive strength of the airline retail office and the travel agent office, however, leaves the on-line channel office as a weaker sales point. Whether this can be explained as the resultant factor of lack of infrastructure, weak interest of customers to go for on-line shopping or unreliability or security concern on the on-line channel, is a contentious issue. All the respondents consider high speed of on-line link to website, downloading of the online booking engine, uninterrupted online booking link, as well as easy and reliable payment scheme as important factors. Essentially, these concerns can be related to the low patronage of the on-line channel, indicating that the sales channel needs to be attended to by the airline. The weakness of the on-line channel, however, leaves airlines with strong and costly indirect distribution channel represented by travel agencies. The convenience of travel agents' ticket-delivery service and auxiliary services like credit sales and under-the-table discounts enables travel agents to build a business reputation over time and the trust of customers as they shave off the strain or

inconvenience of ticket processing protocol for customers and meet other demands not offered by the airline have endeared more customers to the travel agents.

Equally, the research has reaffirmed that commercial airlines are into services/products delivery making it mandatory to have their 'customer' at the nucleus at a time of the airline marketing strategies definition which includes services and/or products distribution channels strategies orientations. Thus, airlines' distribution channel strategies are primarily taking customers' preference so as to respond positively to customers' needs and wants, which is crucial to attain the airline commercial objective. Finally, in Nigeria, the globally, widely-accepted product-distribution channel, the 'online' channel is in the developing stage for which on-line payment security system, computer tool, internet access and lack of awareness on the part of customers have been noted as factors restricting the development. The marketing logic of airlines in Nigeria is to serve its customers from the Nigerian market with what has been the accepted way of doing business, having the core strategy customer at the nucleus and cost-effectiveness remains unchanged. Thus, as such further study into some specific behavioural aspects of customers to service accessibility and performance on 'on-line shop' will be useful to boost patronage across the channels with a long-term business implication of cost savings for airlines. On the other hand, for the 'on-line' airline distributions channel to blossom in Nigeria, government must recognize that the online internet economy needs the provision of basic functional infrastructures, national security on on-line transactions, business policy direction changes and campaign on societal perception change towards 'on-line' business, to gain societal willingness to learn new things, especially e-commerce.

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Future economic liberalization within the global airline industry: previous experiences and future choices

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Abstract: The airline industry consistently generates losses or unsubstantial profit levels. It is highlighted by Holloway (2008) that it is apparent that there structural impediments at work. This paper is an investigation of the impact of the current regulatory model and the requirement for a change in economic regulatory model. This exploratory paper researches over a cross-sectional period to collect primary and secondary data. In-depth qualitative interviews were carried out with industry experts from a range of air transport industry sectors. The research conducted reveals that the airline industry needs to consolidate and that deregulation results in consolidation. Deregulation results in benefits for the industry and the consumer. Out of the potential models, the regional bloc approach is identified as the optimal model for the future global economic deregulation of the airline industry. The research highlights the requirement of competition legislation within a deregulated industry.

Keywords: airline deregulation, regional bloc approach, regulatory model, regional air service agreements.

1. Introduction

For the last 50 years the airline industry has presented itself as a paradox to many onlookers. Despite being characterized by continued and rapid growth it has remained only marginally profitable. Doganis (2010) identifies the trend of the airline industry as showing steady growth in demand experienced at a declining rate. It has been highlighted that most industries experiencing continual growth in demand would generate substantial profits, but this is not the case with airlines. Doganis (2010), however, argues this point claiming that the financial performance of the airline industry, as a whole, has been very marginal with post-tax profits very rarely exceeding 2% of revenues. The small profit margins of airlines are further illustrated by Holloway (2008) in his claim that at the end of 2007 the airline industry earned a net margin of little more than 1%.

When looking at the air transportation chain as a whole, airlines represent the worst performing sector. This is evidenced from an International Air Transport Authority (IATA) study of the return on invested capital (ROIC). Doganis (2010) notes that the sectors with the highest return on capital are dominated by a small number of major suppliers such as global distribution systems (GDS) and aircraft leasing. This is in marked contrast to airlines where no group has global market dominance. Holloway (2008) observes that the airline industry is fragmented relative to other industries of its size and global reach due to governments historically imposing barriers to market entry. Holloway (2008) points to the failings of senior management and obduracy of labour as obvious factors accounting to the downfall of particular airlines, but the continuous underperformance and inability to cover costs of capital within the airline industry indicate that there are structural impediments at work.

A primary driver for the economic regulation of the industry is recognised by Richmond (1971) in his analysis of American views towards early civil aviation. He states that:

“Unregulated competitive market forces may have adverse consequences for the public at large.”

Regulation of the airlines was deemed necessary to prevent harmful competition from damaging a fledgling industry vital to the future security and commerce of the nation (Sampson *et al.*, 1990). The external benefits created by aviation needed to be protected such that the industry needed to be regulated for the protection of the external benefits. The external benefits are illustrated as being economic, strategic, social and also political (Doganis, 2010). The development of state-owned airlines, often operating as the sole international and sometimes only domestic carrier, went further in increasing the importance of regulating the industry to protect a national asset and investment of the national airline. Doganis (2010) furthers this argument by presenting the view that Richmond’s argument was adopted to international aviation, as an *“Absence of any regulation to market entry would inevitably lead to wasteful competition.”*

2. Literature review of Airline Service Agreement (ASA)

To deal with the economic regulation of the industry, three separate but interlinked systems were developed. These are bilateral ASAs, airline pooling agreements and IATA tariff fixing. Doganis (2010) recognizes that together the three regulatory bodies created *“An operating environment unlike that of any other industry...that stifled innovation and change.”* Doganis (2006) and Shaw (2007) claim that governments controlled market competition and access through bilateral ASAs, tariffs and capacities. Doganis (2010) summarizes the effects of regulation to *“Limiting pricing freedoms and product differentiation, restricting capacity growth and excluding new market entrants.”*

Doganis (2010) establishes that the combination of state-owned airline privatization and benefits from large scale marketing alliances created strong arguments for further liberalization following the spread of ‘open market’ ASAs. The privatization of state-owned airlines reduced the level of government protectionism since *“Privatized airlines would be expected to stand on their own without regulatory protection”* (Doganis, 2010). Hubner & Sauve (2001) identify that there are more than 70 active bilateral ‘open skies’ ASAs with a third of them involving countries other than the US. It is claimed, however, that there were over 3,500 bilateral ASAs in force around the world (UNCTD, 1999). They highlight that the extensive exchange of traffic rights, up to and including fifth-freedom rights, open routes and capacities constitute the generally accepted threshold for ‘open skies’ agreements concluded so far Hubner & Sauve (2001). Doganis (2010) evaluates that ‘open skies’ agreements still contain restrictive articles, including foreign ownership and cabotage rights. The UNCTD (1999) concluded that ‘open skies’ ASAs can *“achieve instant market access and therefore do not imply progressive liberalization, but as they are limited to market access, they do not address such issues as right of establishment, foreign direct investment or cabotage.”*

The International Chamber of Commerce (ICC) (2005) points out that the current model of bilateral ASAs and the gradual liberalization of the industry through the introduction of ‘open skies’ agreements offer *“A system that countries are familiar with, and in which change is generally straightforward since it does not entail a large number of consenting parties”* (ICC, 2005). As global markets have developed, the limitations on trade presented by bilateral ASAs have become more apparent (Yergin *et al.*, 2000). Despite the substantial improvements shown from the introduction of ‘open skies’ models, the restrictions still imposed upon cabotage and foreign ownership preserve *“Anachronisms that distinguish the air transport sector from other globalized industries”* (ICC, 2005). These anachronisms continue to limit free trade and optimal

capital movement (ICC, 2005). The Organisation for Economic Co-operation and Development (OECD) (1997) highlights that the particular issues the industry wishes to be liberalized are traffic rights and foreign ownership restraints.

Many bilateral ASAs continue to demonstrate strong protectionist attitudes resulting in the uneven development of market liberalization. This has led to bottlenecks in areas of air transport. The bilateral model has led to difficulties in attaining a high level of efficiency over global airline networks due to the bilateral focus on individual sets of routes (ICC, 2005). The combination of the limited focus of bilateral ASAs and the uneven development of liberalization prevent airlines from planning networks and services purely based upon commercial considerations: “*National differences in the way these market impediments operate also make it difficult in the current bilateral system to bring about their removal*” ICC (2005).

With the developments in global trade liberalization, globalization and e-commerce it has become clear that the bilateral ASA model is unfit to meet the requirements of airlines, consumers and the global economy (ICC, 2005). The deregulation of market access restrictions and foreign ownership limits would enhance the efficiency of air transport as well as associated industry sectors (ICC, 2005). It is the official position of the ICC that the industry needs to move from the bilateral system towards “*A genuine multilateral liberalization of air transport*” ICC (2005). This view is concurred with by IATA (1999), concluding that there needs to be movement from the current system to a multilateral or plurilateral agreement. IATA (1999) identifies that the fundamental question is finding the best method for future deregulation. Thus, this research aims to discover whether a regional bloc approach provides the best model for pursuing global economic deregulation within the air transport industry; with the objective of analysing the impact of the current bilateral model upon the airline industry, assessing the support for a change of economic regulatory model, identifying the preferential future model and to evaluate key legislation for future regulations.

3. Research methodology

The research followed an interpretive philosophy using a deductive approach, and an interview method was adopted. Qualitative data were collected in order to gain in depth views and opinions, which are viewed as subjective data (Wilson, 2010). To collect in-depth qualitative data effectively from a range of sources across a wide geographic area, internet-based interviews were conducted. Skype, an internet video call service, provided a financially viable medium for interviews with globally located participants to be conducted. As with face-to-face interviews, the interviewee is able to reply in an in-depth manner and expand upon certain themes or questions which cannot be achieved through a self-administered questionnaire. This method also ensured that all the objective questions were answered.

Purposive sampling was identified as the primary technique best suited to the research. The purposive method allows for specific organizations, companies, governments or individuals to be targeted based upon their experience, knowledge or involvement in the topic area (Bryman, 2011). The inclusion of participants from various sectors of the air transport industry was targeted so the primary research provided an unbiased response to the research topic. The location of the sample is unlimited due to the use of an internet-based interview medium. The response rate from all forms of participation request was 71%, with an 8% positive response to invitation. The response rate was calculated from the dispatch of 48 invitations, including e-mail invites and online contact request forms. Throughout the collection of primary research the participants were assured of their anonymity.

4. Data analysis

4.1 Liberalization and deregulation

The primary research demonstrated a strong support for the economic deregulation of the airline industry, with 75% of participants specifically stating their support for further economic deregulation. It is clear that there is a common view that: "*Liberalization is very clearly a net pro.*" (L2)

The link between the economic situation and its impact upon attitudes towards liberalization was an apparent theme. It was presented that 75% of research participants recognized that during an economic recession or downturn protectionist attitudes increased. "*With the economic climate being where it is I don't think there is necessarily the appetite for liberalization among some member states and airlines that there possibly was previously.*" (L2)

A consistent outcome from the research is that deregulation leads to increased competition. One hundred *per cent* of the primary research participants recognize competition as a benefit of deregulation. Key factors of lower fares, more consumer choice and increased frequencies were all highlighted as demonstrations of increased competition post-deregulation. L2 states "*Balanced competitive markets deliver better outcomes for consumers.*"

This point is validated by the secondary research. It is highlighted within the secondary research that deregulated markets benefited from an increase in number and frequency of services as well as a reduction in average fares (Caves, 1962; Levine, 1965; Jordan, 1970; Keeler, 1972; Douglas & Miller, 1974; Goetz & Sutton, 1997; Morrison & Winston 2008). L4 identifies that deregulation "*Open(s) globally restricted markets and enable the expansion of services available to passengers...In terms of consumers, there would be better choice and opportunity in the airline options.*"

These competition benefits are identified by L2 and L3 as being experienced in the relative short term. L2 evaluates that in the long term strong airlines benefit. This point is backed up within the primary research by L3 "*In the US it's kind of proven that in some respects deregulation does work but leads to less choice for passengers.*"

The primary and secondary research reveals the link between deregulation and resultant consolidation. Goetz & Vowles (2009) demonstrated the resultant consolidation following US domestic deregulation and the emergence of a group of ten 'major' carriers. L3 recognizes the consolidation within the US airline industry and points to further consolidation within the carriers "*... has already been witnessed in America with the merger of Delta and North West and now United-Continental, later USAir and American; so there will be a three-airline market from what was an eight- or nine-airline market.*"

Consolidation within the EU following the creation of the EU Common Aviation Area is also identified in the primary research. L2 and L3 both point to the consolidation of airlines under the Lufthansa and IAG brands as evidence of European consolidation. L3 evaluates that there is the emergence of three airline groups with IAG, Lufthansa and Air France.

The research illustrated potential future issues regarding the reduction in competition and its impact to the consumer. L2 summarizes "*There is a question about whether some airlines could be so big that they could predatory-price on routes to knock-out new entrants...or make those markets incontestable.*"

The literature review complies with this conclusion. The consolidation around the ten year period following US domestic deregulation led to over 200 carriers being absorbed, resulting in the dominance of the ten 'major' US airlines being increased from 87% pre-deregulation to 92%

in 1990 (Williams, 1993; Goetz, 2002). The economies of scale apparent between the US ‘majors’ and a new entrant posed a barrier to market entry for smaller carriers (Levine, 1987; Small, 1993; Goetz & Sutton, 1997). L4 highlights the potential for this trend developing within the EU “*An issue would be the expansion of national carriers and alliances on routes and operating together, like BA/IB, Lufthansa Group and Star Alliance.*”

The primary research contributed that the deregulation of ASAs had an impact upon the wider economic situation of areas and regions. Interview L4 pointed to the economic boost created by new routes, offered on liberalized ASAs, giving the example of the Newcastle –Dubai route by Emirates that produced a GBP 280 million boost to the area’s economy and created an extra 150 jobs. The introduction of new routes and services, as a result of free market entry “*Enables growth in the region. BHX has experienced a growth in flag carriers and LCCs, resulting in better employment and brings trade to the region as a result of increased market access and operations from EU regional liberalization.*”

4.2 The bilateral model

The primary and secondary research concur that the familiarity presented to the current bilateral model is its essential benefit. There are over 3,500 bilateral ASAs in existence according to the UNCTD (1999). It is concluded by the ICC (2005) that the liberalization through the bilateral model offers “*a system that countries are familiar with and in which change is generally straightforward since it does not entail a large number of consenting parties*” (ICC, 2005).

The primary research justifies the secondary research. Interview L4 states that “*everybody is used to and familiar with the system.*” The secondary research evaluates the current bilateral model as responsible for creating “*an operating environment unlike that of any other industry...that stifled innovation and change*” (Doganis, 2010). The primary research confirms this concept, describing the model as having “*led to unfairness*” (by L3) and critically being “*globally restrictive*” by L4.

4.3 A change of model

The primary research confirms the conclusion of literature review that the method of economic regulation needs to be changed (IATA, 1999; UNCTD, 1999; ICC, 2005). “*With the developments of global trade, liberalization and e-commerce have demonstrated the bilateral ASA model is unfit to meet the requirements of airlines, consumers and the global economy*” (ICC, 2005). Interview L6 agrees with the literature findings, claiming that “*There is a need to organize on a more global basis.*”

The literature review highlights the difficulty and the extended time period that would be associated to liberalizing the global economic regulation system through the bilateral model. The ICC (2005) evaluates that “*National differences in the way these market impediments operate also make it difficult in the current bilateral system to bring about their removal*” (ICC, 2005). The primary research concurs with this analysis, with 75% of participants identifying the politics and time period resulting from deregulation through the bilateral system would be “*extremely long*” (L4) and “*extended*” (L3).

4.4 Unilateral instantaneous approach

The economic liberalization of the global airline industry through a unilateral instantaneous approach received support from all the interview participants. The primary research built upon the secondary research conclusion, that the model allowed “*complete, one-stage deregulation*” (Hubner & Suave, 2001), and provided information on the benefits associated with an

instantaneous approach. It is recognized by the primary research that the benefit offered through an instantaneous approach would “*create a single agreement and all market opportunities will be harmonized with no split between standards*” (L4). It is highlighted by interview L3 that the gradual approach adopted in EU regional deregulation impeded some airlines “*Gradual approach hindered airlines that wanted to compete from the outset.*” Despite the support and benefits identified, the support from the primary research was limited for a unilateral instantaneous approach to being classed as the best theoretical method.

Two key issues arose from the research. The major issue, as identified by the secondary research, would be the political resistance to creating a unilateral agreement. Hubner & Sauve (2001) in particular highlight the potential resistance from “*Countries whose level of trade, economic or political development would not allow them to participate as full competitors.*” The political resistance to a unilateral agreement is justified in the primary research. Seventy-five per cent of participants evaluated that the level of political agreement required would provide a considerable issue to the unilateral approach for global economic deregulation. Interview L4 expands on this, claiming that “*It is not realistically achievable as the political process for reaching a global unilateral agreement is not likely due to the individual countries agendas and policies.*”

The issue of expanding the EU ETS agreement beyond the EU member states is highlighted in the primary research by interview L2 and L4, as an example of the political resistance a unilateral agreement would receive. Interview L2 concludes the issue of creating a unilateral deregulation agreement with the example of EU ETS “*EU ETS, on the environmental side, shows the complexity of getting a global agreement that would be required for that level of liberalization.*”

The primary research added a second issue associated to a unilateral instantaneous approach that was not covered by the secondary research. Interview L3 highlighted that due to the relationship between deregulation and consolidation, an instantaneous agreement would “*lead overnight to a huge amount of causalities from a huge amount of consolidation.*”

In conclusion to a unilateral, instantaneous approach the primary research indicates that the theoretical benefits provided by this approach make it the preferential model for global economic deregulation. Due to the practical issues, however, especially regarding the political agreement required, 100% of the primary research evaluates that an alternative gradual approach is more realistic. Interview L4 quotes “*A staged approach would be more realistic in happening, like with the EU using three packages to introduce liberalization to the EU market.*”

4.5 WTO GATS multilateral approach

The multilateral agreement concept proposed within the secondary research is promoted as offering a gradual approach and allowing for substantial liberalization between a group of like-minded WTO members (Hubner & Suave, 2001). The primary research contrasts to the literature, highlighting the issue of a limited multilateral agreement. Interview L3 gives the examples of the history of price fixing cartels as a demonstration of the negative impact of ‘club’ agreements. Interview L3 states that: “*any type of ‘club’ agreement goes against what a free market economy should be.*”

The value of an independent industrial regulatory body is identified in the secondary research by the UNCTD (1999). The primary research agrees with the secondary research regarding the benefit of an international independent body. Interview L4 concurs with the secondary research, analysing that an “*independent international body is a good idea for liberalizing traffic rights from national control.*” The primary research highlighted that the political concession of control

from a country to an international body would be very unlikely. Interview L6 claims *“I just don’t think any country or union would be willing to give up that political, business and economic leverage to an international organization.”*

This is validated within the secondary research by Hubner & Suave (2001) in the evaluation *“Governments decided to cover the sector in a unique but very limited way via a GATS Annex on Air Transport Services, which excludes traffic rights and services related to the exercise of traffic rights.”*

The secondary research highlights the issue of other international organizations, IATA and ICAO, with jurisdiction in the regulatory field (Abeyratne, 2001). The UNCTD (1999) evaluate that the industry preference would be for ICAO, as an industry body, to lead this model of approach. This point of view is supported by interview L2 in the conclusion that *“Aviation in some ways is unique to other forms of services.....it should have its own forum and the ICAO is the only obvious forum for doing that.”*

This perception is contrasted within the primary research. Interview L4 evaluates that although IATA and ICAO have a better industry understanding than the WTO an independent body with a *“vested interest could be dangerous.”* Janda (2001) suggests a MoU is developed between ICAO and WTO to strengthen co-operation, leading to the WTO, GATS taking on a complimentary role to ICAO. The primary research contrasts to this conclusion; interview L4 suggests that *“ICAO and IATA could serve as advisors to the WTO in a complimentary role.”*

The primary research built upon the literature review, and reveals a perceived issue regarding an international Dispute Settlement Board (DSB). The potential difference of agenda from an international scale compared to a localized level could produce undesirable judgements upon local aviation development. Interview L4 claims that there could be *“A problem with the agenda of the international body differing from what is required or agenda at a more localized level.”* This position is balanced within the primary research, however, by interview L4 in the recognition that the WTO, DSB would *“... remove regional or national bias in potential anti-competitive or dispute decisions.”*

4.6 Regional bloc model

The regional bloc model is supported as the preferable model for future economic deregulation by 75% of the primary research participants. Interview L2 was the exception to the view that regional blocs offered the preferred future model for deregulation, stating that *“... a global solution is better than a regional solution.”*

Interviews L3, L4 and L6 claimed that the regional model is the “most practical model” (L3). The primary research also identified that the model is “very viable” (L4). Interview L3 quotes that the *“Regional blocs I think are the sensible way forward.”* This is concurrent with findings in the secondary research where IATA (1999) concludes that the logic and experience of European deregulation markets demonstrate that future deregulation will be negotiated on a regional, then global basis.

The benefits associated with the proposed model are illustrated throughout both the primary and secondary research as improved efficiency, increased negotiating power for members and acting as a method for achieving global economic deregulation. The increase in negotiating power is evaluated within the secondary research as a benefit provided by the development of regional blocs (UNCTD, 1999; IATA, 1999). The primary research confirms the findings presented by the secondary research regarding this aspect. Interview L3, L4 and L6 each identify the benefit of increased negotiating power provided through forming regional bloc

agreements. They quote “Regions would offer greater negotiating powers than countries on their own” (L4).

“Power is in volume. You are going to get a better deal negotiating if everybody is together rather than individually” (L3).

“Each bloc would be stronger in its own interests as well as its interest to liberalize trade” (L6).

The potential for the regional model to achieve global deregulation is a contested point through both primary and secondary research. It is argued by economists that regionalism can foster multilateral liberalization (Aho, 1993; Woolcock, 1993; Planque, 1993). Interview L3 agreed with this position, claiming that regional blocs can act as “... an initial stage to then further develop into global deregulation.”

Michalak & Gibb (1997) predict that a triad of dominant regional blocks will develop in the world economy, a NAFTA, EU and an Asian Bloc, whilst countries outside regional blocs will become increasingly isolated and dependent upon bilateral agreements with each bloc. This view is supported by Findlay & Round (2006) in their analysis “Plurilateral structures do not necessarily build up to global free trade the new interests they create which impede extension of their membership. Plurilateral agreements applied to one sector are even less likely to make progress towards liberalization.”

The secondary research identifies the EU, the North American Free Trade Agreement (NAFTA), and the emerging Asian-Pacific Economic Co-operation (APEC) trading blocs as the furthest developed and becoming more prominent in the process of economic globalisation (Sopiee *et al.*, 1987; Sorenson, 2001). The primary research validates this point; interview L3 highlights “Canada, US and Mexico will create a kind of regional bloc, which will then have an agreement with the EU. This could then merge in itself to create a Trans-Atlantic region. I think most Asian countries will start to work together as we see consolidation there which will bring in Australia as well. So I can see three regional blocs developing.”

Interview L6 discusses the potential of regions developing “I can see the development of a South American bloc. I think they are pretty close to that happening now. Africa maybe more fractured, India may look to act on its own, and an Asian bloc I think is there.”

The primary research expands upon the literature review by analysing the progress and extent of other regional agreements and developments. Interview L2 suggests that “Experience doesn’t seem to suggest that. Firstly, none of the other regional blocs seem to have the appetite that the EU does to go as far down an integrated approach.”

The primary research highlights an issue not substantiated in the literature review regarding the development of regional blocs. In the creation of a NAFTA regional bloc the primary research highlighted that US protection of foreign ownership and cabotage rights could present an issue. Interview L6 argues that “There would probably be a big political battle about US access to cabotage within Canada and Canadian cabotage within the US. The reason being that 80% of the Canadian population lives within 200 miles of the border, so it’s a very thin catchment area across the border whereas a Canadian carrier would go within the States and get access to more passengers.” “... cabotage within the US will be one of the big hang ups in the future” (L6). It is concluded by L3 that the regional bloc model could take an extended period of time to deliver deregulation to markets as it could take “...years for other regions to develop to the same level as what the EU is at currently.”

4.7 Lead sector approach

The primary and secondary research reveals limited support and substantial issues associated to a lead sector approach, particularly the liberalization of the air cargo sector. The ICC (2005)

promotes the introduction of a separate unilateral agreement for the deregulation of air cargo services, which is partly supported by the primary research. Interviews L4 and L6 highlight that the air cargo industry does not experience some of the issues associated with deregulating the wider air transport industry. It is highlighted in the secondary research though that the air cargo sector is a complex sector due to the involvement of integrated and underbelly operators (IATA, 1999). This is supported in the primary research. Interview L2 analyses that it is “... *very hard to separate freighter and belly hold cargo*”.

The secondary research highlights that any sector liberalization would have to benefit all sector participants (OECD, 1999). Interview L2 offers support for this point, quoting “*Policy measures of any kind that are applied to one without being applied to the other are messy and can create perverse incentives.*” The implementation of a lead sector approach is summarized by interview L3 as “... *very academic with very little opportunity to develop in the real world.*”

4.8 Essential legislation in future deregulation models

The primary and secondary research highlighted that through any future deregulation, competition and safety legislation and regulation are essential. The OECD (1999) argues that deregulation has to enhance efficiency and competition without compromising “the quality of services, safety or the environment” (OECD, 1999). This point is supported within the primary research by interview L6, stating that “*The safety record can’t be allowed to drop.*”

Within the secondary research the UNCTD (1999) claim that liberalization without competition legislation would not work. The corresponding development of national competition authorities with the liberalization of ASAs demonstrates the importance of competition policy within deregulated markets (Smithies, 2001). This is supported by 100% of primary research participants. Interview L4 commented “*There needs to be legislation to prevent anti-competitive or monopolistic characteristics or behaviours being demonstrated which would be detrimental to consumers.*”

5. Conclusion and recommendation

It is concluded that deregulation provides net benefits. The economic benefit for areas created by additional routes was highlighted as a benefit from deregulation of routes, as more services and routes are developed. Despite the identification of consolidation as a resulting factor from deregulation it is recognized by the research that competition is increased, because market access restrictions are removed; this results in average lower fares for consumers. In the long term, however, it is identified that consolidation can eventually lead to less choice for passengers and that oligopolistic or monopolistic markets result in higher fares for consumers.

A conclusion from the research gathered found it is essential for any future regulatory model to include competition legislation. It emerged from the research that a WTO Air Transport DSB and competition legislation, with the supplementary input of ICAO and IATA, would be a preferable development as an independent international body-led solution to dispute and competitive issues.

The research identifies that the bilateral model is the predominant current regulatory model and offers countries a model that is widely understood and familiar. The primary and secondary research, however, identified many issues with the current bilateral model including: it is globally restrictive, presents uneven opportunities, and is heavily dominated by political rather than business or financial motives. The research concludes that a change of model is needed, with particular attention drawn to organizing on a wider global basis.

The unilateral instantaneous model was highlighted as offering the best theoretical option for global deregulation; but, due to the serious issue regarding the political consensus required for the creation of such an agreement, it was dismissed by the primary research as an unviable model for global deregulation. It is concluded that the WTO GATS model would suffer the issue of political consensus as well. The WTO GATS model was identified to also be unsuitable as a result of the development of a limited multilateral dual regime agreement and the removal of national control. It is concluded by the authors that the lead sector approach, especially regarding air cargo, is an unviable model due to the complexity of implementation and level of applicability from any experience to other air transport sectors.

A regional bloc approach is recommended as the optimal model for the development of global economic deregulation. Although concerns were raised in the research about the ability of regional blocs to foster complete global deregulation it is recognized that they do have the potential to achieve this and offer the minimum of liberalization within the regional blocs. The extent and development of regional agreements is cited as a demonstration that a regional bloc approach is viable and already developing. The research identifies that not all countries would join a regional bloc, at least until it was apparent that there was a negative impact from operating as an individual nation. These countries would continue using the bilateral model to negotiate with regions, as currently demonstrated by the EU horizontal agreements with the US.

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The importance of environmental determinants when selecting a preferred airline: a survey of large-sized corporations in South Africa

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Abstract: Organizations worldwide are increasingly pressurized to find “green travel suppliers”, since business travel is a significant contributor of carbon emissions. When an organization is faced with selecting a preferred airline for their business travel, how important are environmental determinants? The results of this study showed that while corporations have shown an increasing interest in eco-friendly travel management, green travel choices may often conflict with the greater need to cut costs and are, thus far, not considered a significant determinant in corporate airline selection.

Keywords: business travel, preferred airline, environmental determinants, South Africa.

1. Introduction

Business travel is critical for many corporations and clearly brings economic benefits. Nonetheless, as a substantial proportion of all air travel, business travel is a significant contributor to aviation climate impacts (Manchester Metropolitan University 2008). It has been demonstrated that corporate travel departments are increasingly tasked with reporting on travel-related carbon emissions to senior management and, consequently, they are becoming creative in terms of finding ways to encourage their travellers to reduce their business travel (Stellin 2008). Some of them are considering using carbon emissions data as a way to make business travellers aware that responsible travel is vital to the sustainability of the planet (Business Traveller Africa 2009a:6). A study undertaken by the Association of Corporate Travel Executives (ACTE) and KDS (2007) revealed a number of interesting findings in relation to eco-friendly travel: in 2009 there was a 15% increase, globally, in eco-friendly travel management behaviour compared to 2008; European companies (42%) as opposed to US companies (35%) appear to be more concerned about the impact of travel on the environment; and respondents said that when booking a business trip their choices of transportation were influenced by the corporation’s travel policy, giving preference to suppliers possessing a CSR (Corporate Social Responsibility) charter; one respondent, a travel manager, working in Africa for a corporation with more than 10,000 employees, expressed the need of corporations for greener airline options by stating “we certainly aim to use airlines that are more focussed on reducing carbon emissions”.

Through this greater awareness airlines have started to improve their environmental policies accordingly. According to Tsai and Hsu (2008:188) CSR programmes are becoming focal points in the business strategies of airlines, given the rising concerns about the environmental impacts of air transport and fuel efficiency forms, making this a crucial element of these programmes. On the other hand green travel choices may conflict with a corporation’s to cut costs under current economic conditions. For instance, European corporations may opt to make use of high-speed rail services which produce lower emissions than airlines but are often more costly than a low-cost flight over the same route. A corporation then needs to consider which is of greater concern under the circumstances and under economic pressure green business travel may become less of

a priority for corporations. It would appear that green travel choices remain scarce at this stage but according to the ACTE and KDS (2007) study the longer term looks more promising, once the economy permits.

In the business travel environment most previous research has highlighted determinants that are important in airline selection from a business traveller perspective (Fourie & Lubbe 2006; Harris & Uncles 1999; Hlekane 2009; Huse & Evangelho 2007; Leng Ong & Tan 2010). Some studies have investigated the determinants of airline selection from a corporate management perspective (Douglas 2008; Mason & Gray 1999; Pachon *et al.* 2007). The important determinants for corporations have generally been recognized as the cost to corporation, ease of booking and airline performance in terms of safety, frequencies, routes and various aspects of service quality, which encompasses the needs of the travellers themselves. Whether environmental concerns such as CO₂ emissions, an airline's perceived "environmental responsibility" and the aircraft fleet of an airline are more important to business travellers than to corporations in the selection of a preferred airline is unknown and this question has not received much attention in the research domain. The purpose of this research study was to ascertain, in relation to other determinants of airline selection, how important environmental concerns are to corporations.

2. Methodology

A survey of corporate travel managers in South Africa was undertaken. The target population was sampled using a purposive non-probability convenience sampling approach (Mouton 2001) made up of corporations listed on the South African Airways' database of corporate clients (totalling 50) and the 2009 register of all listed JSE (Johannesburg Stock Exchange) companies (totalling 350). Corporate travel managers, or the person responsible for the procurement of travel in a given company, were deemed suitably qualified and experienced in corporate travel management to provide relevant and valid answers to the questions in the survey. Their suitability was established based on the position they held and through the invitation letter which indicated that the questionnaire was addressed to the person responsible for the procurement of travel.

A web-based questionnaire was developed and distributed by e-mail to the target population delivering 109 useable responses resulting in a 27% response rate. The results covered two areas of investigation: to identify the determinants used by corporations to select preferred airlines and to measure the relative importance of environmental determinants in the selection of a preferred airline. Exploratory factor analysis was done to identify which determinants of airline selection were interrelated and considered important.

3. Results

A four-point Likert scale was used to collect respondents' views on corporate airline selection determinants for both international and domestic travel. A scale ranging from 1 (disagree) to 4 (agree) was used for the purpose of determining the relative importance of selection criteria. The modes and medians were calculated, as appropriate for ordinal data. Due to the many ties, the arithmetic means were, however, also calculated to rank the items. The mean score was used to establish the relative importance of each of the determinants, which showed that routes, safety record, and convenience of schedules played the most significant (significance here refers to the wording in the question) role in the selection of a preferred airline for international business travel. Corporate airline selection determinants perceived as playing the most significant role in

domestic travel, were frequency of flights, routes, and convenience of schedules. An airline's perceived environmental performance rated amongst the lowest four determinants (of 22) in importance in the selection of airlines for both domestic and international travel.

Table 1. Rotated factor loadings for *international* business air travel

<i>Corporate airline selection determinants</i>	Factor 1	Factor 2	Factor 3	Factor 4	
	Traveller-related	Company-related	Secondary determinants	Environment-related	
In-flight amenities	0.415	-0.180	0.153	0.148	
Safety	0.434	0.169	-0.050	0.000	
Luggage	0.668	-0.068	0.159	-0.033	
On-time performance	0.409	0.265	0.285	0.060	
Service	0.652	0.186	-0.013	-0.065	
Comfort	0.776	0.015	-0.170	-0.002	
Lounges	0.333	0.146	-0.055	0.304	
Convenience of schedules	-0.014	0.772	0.098	0.006	
Routes	-0.118	0.795	0.006	-0.019	
Direct service	0.206	0.539	-0.128	0.085	
Ticket flexibility	0.263	0.380	0.316	0.065	
Negotiated discounts	0.132	0.330	0.254	-0.067	
Frequency of flights	0.089	0.460	0.512	0.034	
Airport location	0.247	0.040	0.644	-0.031	
LCC airfares	-0.169	0.051	0.375	0.145	
Ease of booking	0.082	0.067	0.593	-0.005	
Alliance	0.073	-0.001	0.383	0.255	
Environmental responsibility	0.103	-0.125	0.303	0.705	
Fleet	0.172	0.223	-0.397	0.390	
CO ₂ emissions	-0.140	-0.006	-0.008	0.879	
	Factor 1	Factor 2	Factor 3	Factor 4	
	Traveller-related	Company-related	Secondary factors	Environment-related	
Eigenvalue	2.089	1.887	1.579	1.268	
Data variance explained	25%	8%	7%	6%	45 %
Cronbach Coefficient Alpha	0.775	0.759	0.655	0.641	
Standard deviation	0.428	0.443	0.470	0.586	
Weighted average importance	3.2011	3.5138	3.1115	2.5413	

An exploratory factor analysis was then undertaken to identify if an underlying structure exists in the set of selected variables. The factor loadings of each of the airline selection determinants verified the factor under which they should be classified. A distinction between domestic and international flights was required since the importance of some individual determinants impacting airline selection may increase or diminish depending on the length of the trip (more than 4 hours is considered a long trip and from South Africa, this would constitute an international trip). Under the international business travel category, variables were grouped into

four factors, based on the eigenvalues and the literature studied. The Cronbach's alpha coefficient was employed to measure the internal consistency and reliability of variables within factors and ranged between 0.641 and 0.775, indicating an acceptable match among variables within one factor. Twenty-two variables were grouped into four factors, based on factor loadings. The highest factor loading (highlighted in bold) determined to which factor a particular airline selection criteria belonged. Two determinants that were originally identified in the literature review, namely "national airline" and "frequent flyer programme", were omitted because of their low factor loadings.

As can be seen from Table 1, the first underlying structure reflected airline selection determinants which were important to the business traveller; these included comfort, handling of luggage, service, safety, in-flight amenities, on-time performance, and lounges.

A second underlying structure reflected airline selection determinants which were considered "Important to the company"; these included routes, convenience of schedules, direct service, ticket flexibility, and negotiated discounts.

Table 2. Rotated factor loading for *domestic* business air travel

<i>Corporate airline selection determinants</i>	Factor 1	Factor 2	Factor 3
	Company-related	Traveller-related	Environment-related
Convenience of schedules	0.659	0.053	0.076
Routes	0.677	0.045	-0.023
Direct service	0.361	0.242	-0.039
LCC airfares	0.397	-0.081	0.040
Ticket flexibility	0.713	-0.043	0.061
Negotiated discounts	0.577	-0.100	-0.044
Frequency of flights	0.293	0.025	-0.070
Airport location	0.354	0.138	-0.016
On-time performance	0.614	0.116	-0.027
Ease of booking	0.484	-0.036	0.130
Fleet	0.020	0.399	0.311
Lounges	-0.022	0.583	0.249
FFP	0.058	0.414	0.202
Comfort	0.004	0.770	-0.291
Service	0.280	0.554	-0.164
Alliance	0.079	0.421	0.099
In-flight	-0.099	0.537	0.106
Luggage	0.021	0.501	0.037
Environmental responsibility	0.167	0.109	0.747
CO ₂ emissions	-0.037	0.084	0.959
	Factor 1	Factor 2	Factor 3
	Company-related	Traveller-related	Environment-related
Eigenvalue	5.088	2.478	1.646
Data variance explained	13%	18%	7%
Cronbach Coefficient Alpha	0.783	0.778	0.876
Standard Deviation	0.356	0.472	0.704
Weighted average importance	3.4571	2.8230	2.4152

38 %

The third underlying structure identified was labelled “Secondary determinants” (a grouping of determinants that was perceived less important in corporate airline selection for international business travel). These included: airport location, ease of booking, frequency of flights, alliance, and low airfares.

“Environment-related airline selection determinants” were grouped into factor four namely: CO₂ emissions, environmental responsibility, and the aircraft fleet of an airline. These are clearly the four driving factors (with their related determinants) behind the selection of an airline by corporations for international travel. It could be derived from the weighted average importance (obtained by making use of the factor loadings) that the factor “Company-related determinants” played the most significant role in the selection of a preferred airline, when travelling internationally.

The same procedure was followed for domestic business travel with Table 2 showing the results of the factor analysis. The first underlying structure identified were airline selection determinants perceived to be “Important to the company”: these included convenience of schedules, routes, direct services, low airfares, ticket flexibility, negotiated discounts, frequency of flights, airport location, on-time performance, and ease of booking. A second underlying structure identified reflected airline selection determinants which were considered “Important to the business traveller” including comfort, lounges, FFP, service, alliances, in-flight amenities, aircraft fleet, and luggage. “Environment-related determinants” represented factor three which included CO₂ emissions and environmental responsibility. Analogous to the results for international business travel, the factor “Company-related determinants” played the most significant role in the selection of a preferred airline for domestic travel. This was established from the weighted average importance of the factors.

4. Discussion

The fourth driver behind the selection of a corporate preferred airline for international business air travel is “Environment-related determinants”. The determinants classified under this group are CO₂ emissions, environmental responsibility and the aircraft fleet of an airline.

As discussed earlier eco-friendly travel management behaviour has been observed in regions such as Europe and the USA where corporations have become aware that responsible travel is vital to the sustainability of the planet. This is in line with the findings of the empirical study which was conducted within a South African corporate travel context. While the first two determinants are clearly elements that support the environmental responsibility of a corporation, an airline’s modern fleet of aircraft may have a less negative impact than an older fleet of aircraft and thus influence the purchase decision of the travel manager. In other words, the newer the aircraft fleet is of an airline, the lower the CO₂ emissions should be.

It can be concluded that while corporations have shown an increasing interest in eco-friendly travel management, green travel choices may often conflict with the greater urge to cut costs under current economic conditions and are, thus far, not considered a significant determinant in corporate airline selection. While the determinant “type of fleet” was grouped under the factor “environment-related determinants” for international airline selection for domestic airline selection it is considered a “traveller-related determinant”. While the type of aircraft fleet may support responsible travel (as newer aircraft are more fuel efficient), a modern type of fleet may also result in more comfort on board a flight for the business traveller.

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New horizontal air transport agreements boost between Europe and third countries: has traffic increased?

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Abstract: The European Commission has signed first horizontal air service agreements (ASAs) with several countries, allowing for “community carrier designation”, in order to bring existing bilateral ASAs into legal conformity with the 2002 ECJ judgment on “nationality clauses”. Based on OAG data analyses and literature reviews, we analyse if these new agreements have had any positive effects on service levels. We find that market access is not facilitated and hence traffic not stimulated in cases in which bilateral frequency limitations are still in place. On short-haul open-sky markets, however, especially low cost carriers make significant use of community carrier designation.

Keywords: horizontal/bilateral air services agreement (ASA), nationality clause, European Union, air transport, community carrier designation.

1. Introduction

Most bilateral air service agreements, be they open sky or not, grant traffic rights only to carriers of the two signatory states (“nationality clause”). In 2002, the European Court of Justice (ECJ) found this exclusion of community carriers from air transport markets between other Member States and third countries to be in breach with EU law. Hence, the EC has signed a number of horizontal ASAs with third countries in order to amend the existing agreements by removing any nationality clauses. The objective of the horizontal air service agreements is not only to bring existing ASA in conformity with the ECJ decision, but also to foster traffic increases. For example, DG MOVE sees a new horizontal agreement with Indonesia as “an important step towards strengthening aviation relations and ... encouraging traffic” (European Commission 2011).

In this paper, we analyse if the removal of the nationality clauses in newly signed horizontal ASAs has indeed encouraged traffic growth. In other words: have community carriers inaugurated to third countries from Member states other than their home country?

Our findings are based on literature reviews and air transport supply data provided by OAG. In addition, useful information on the current practice with regard to the situation concerning traffic rights between Germany and a number of third countries was provided upon request by the German Ministry of Transport.

2. From bilateral to horizontal ASA and open skies

Since its beginnings, and – ironically – despite its nature as a cross-border industry, air transport has been one of the most heavily regulated sectors. Following the 1944 Chicago Convention, international air traffic used to be based on bilateral air service agreements in which limited amounts of traffic rights between designated airports were granted to selected carriers of the signatory states. In most markets, supply was hence artificially limited, resulting in monopoly prices and low frequencies. For about a decade following the post-1978 domestic market deregulation in the US, intra-EC traffic became also step-wise liberalized; by 1997, all bilateral

air service agreements between the EC Member States were replaced by an open aviation area which includes full open skies, i.e., free market access and pricing on virtually all Community routes for all Community carriers. As a reaction, LCC would emerge as new competitors, and intra-EC air traffic rose rapidly. Existing bilateral ASAs setting the rules for any international air traffic between the EC Member States and third countries, however, were not automatically affected by this process. Since 1992, progress was, however, made on some important markets, with a series of bilateral open skies agreements being signed between a growing number of European countries and the US. Cosmas *et al.* (2010) provide an overview of these agreements, which usually include full open sky on 3rd and 4th (and often 5th) freedom traffic for carriers of the signatory states.

All bilateral agreements, open sky or not, had in common that only carriers based in the signatory states had the right to fly (“nationality clause”). On 5 November 2002, the European Court of Justice (ECJ) found that this exclusion of community carriers from other Member States, from services between a Member State and a third country was not in conformity with EU law.² Consequently, the European Commission has signed a number of new horizontal air service agreements with third countries, which eliminate any nationality clauses in the – still – existing bilateral agreements and hence give all European carriers the right to use existing traffic rights from any member state – subject to availability. By September 2009 (the EC has not yet updated its status table), new horizontal ASAs were signed with 49 countries, amending 699 bilateral agreements. Albania, Bosnia and Herzegovina, Croatia, FYR of Macedonia, Iceland, Montenegro, Norway, Serbia and Kosovo have even joined the European Common Aviation Area (ECAA) in which all traffic is treated the same as EC-internal air traffic as European Community’s aviation law is fully applied, including unlimited traffic rights for all ECAA-based carriers (European Commission, 2010). In addition, a new aviation agreement from 2006 opens the markets between the EC and Morocco, thus coming close to an ECAA (European Commission, 2006). Figure 1 systemizes some sample ASAs of European countries with regard to market access (availability of traffic rights) and Community carrier designation (applicability of the nationality clause).

Market access	Open sky	Germany-Turkey (nationality clause still not removed, but virtually unrestricted 3rd and 4th freedom traffic in practice)	EU-Balkans/Iceland/Morocco/Norway EU-US (open sky incl. 5th freedom; no cabotage for EC carriers in US)
	Restricted	„traditional“ bilateral ASA such as Spain-US (until 2008)	EC-Armenia, Brazil, Chile, Singapore, UAE...
		yes	no
		Nationality Clause	

Figure 1. Characterization of ASA of EC Member States
Source: Own figure.

² See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:61998C0466:EN:HTML:NOT>, retrieved 30 July 2012.

3. Traffic impacts of horizontal ASAs

The impact of air transport market liberalization on traffic supply has been well discussed in the economic literature, with a focus on the US and Europe. Based on Morrison and Winston (1995), interVISTAS-ga² (2006), or Button (2009), it can be concluded that domestic and international air transport liberalization has resulted in more intense competition, lower costs, new demand, and thus overall traffic increases. With regard to the effects of the liberalization of international air service agreements, most papers or studies that have been published tackle the EU-US market. Cosmas *et al.* (2010) and Brattle Group (2002) analysed how traffic levels developed following the signature of bilateral open sky agreements between 22 European countries (not including UK, Spain, Greece, Hungary and Ireland which had not signed such agreements) and the US from 1992 on. They found that some – including the largest markets – showed overall increases in service levels in the post-liberalization years. Some markets, however, e.g., US-Scandinavia, also experienced traffic reductions. Possible explanations for this could be a trend to more hubbing from the largest EU-airports during the '00, and the weak financial state of the most national carriers from smaller EU states. Hence, liberalization seems to be a necessary rather than a sufficient condition for traffic growth.

In *ex-ante* assessments, the potential impacts of the EU-US horizontal open sky agreements were estimated, which came into force in 2008, and in which all existing nationality clauses and restrictions for 3rd, 4th and 5th freedom rights were eventually removed. Brattle Group (2002) and Booz Allen Hamilton (2007) predicted significant growth rates, especially for the markets (US-ES/GR/HU/IR/UK) without earlier bilateral open sky regime. Actual traffic growth, however, was far more modest than what had been predicted. Humphreys & Morrell (2009) used OAG data for the summer of 2008 to look at the first outcomes of the new agreement. They found that US-traffic from and to Heathrow (LHR) – which was artificially restricted in the Bermuda II bilateral ASA – grew strongly, albeit at the expense of Gatwick (LGW) which lost several daily US flights. Hence, the summer 2008 net increase in seats between London (LHR and LGW) and the US amounted to only about 5%.

The removal of nationality clauses in the newly signed horizontal agreements, however, and its specific impacts, has so far not been prominently been assessed. One exception is Humphreys & Morrell (2009) who observed that European airlines were hardly making use of the removal of the nationality clauses on the EU-US transatlantic market, with Air France and newly founded BA-subsiidiary “Open Skies” being the only EU carriers to launch US-bound flights (Air France: LHR-Los Angeles; Open Skies: Paris-New York) from outside their respective home countries. A third and apparently last example is Aer Lingus operating the Madrid-Washington route on behalf of United Airlines. The Air France flight was, however, ceased only six months after its inauguration in October 2008, and the Aer Lingus service will be discontinued in the winter of 2012/2013.

In the following, we look at July 2012 OAG data to find out if there are any more markets in which EU carriers made use of the removal of the nationality clause. The data analysis reveals that airlines make use of the removal of the nationality clause on flights from Europe to destinations in the countries listed in Table 1.

It shows that most routes to non-EU countries which are served from EU carriers from places outside their respective home country go to Croatia, Morocco and Kosovo, i.e. to countries that are form a common aviation area with the EC Member States. The only routes which do not fall under any open sky agreement go from Italy to Moldova, from Slovakia to Israel, from Ireland to Egypt and from Sweden and Denmark to Iraq.

Also from the carrier perspectives, flights from non-home EU countries to non-EU countries do not play a major role, as can be seen in Table 2.

Based on these observations, we can draw the conclusion that the removal of the nationality clause as such will not yield in much additional traffic. Generally, EU airlines seems to inaugurate traffic from non-home EU countries only if the respective market is completely liberalized (open sky), for instance to Croatia or Morocco. The assumed reasons are:

- a) that on other – non-open-sky – markets, traffic rights are usually not available due to (frequency) restrictions set in the respective bilateral agreements that are still in force, and
- b) that demand to some destinations might simply be too low.

Table 1. Routes with usage of community carrier designation

Airline	Home Country	Routes from “non-home” EU country to non-EU country
Adria Airways	Slovenia	Germany-Kosovo, Italy-Kosovo
Belle Air Europe	Italy	Austria/Germany-Macedonia/Kosovo Belgium/Sweden-Kosovo
Carpatair	Romania	Italy-Moldova
easyJet*	UK	France/Germany/Italy-Croatia/Morocco Netherlands/Spain-Croatia
Intersky	Austria	Germany/(Switzerland)-Croatia
Germania	Germany	Sweden-Iraq
Germanwings	Germany	France-Kosovo
Jet Air Fly	Belgium	France/Italy/Spain-Morocco
MeeladAir	Greece	Denmark-Iraq
Norwegian Air Shuttle	Norway (ECAA)	Sweden-Bosnia/Croatia/Kosovo/Turkey Denmark/Finland-Croatia
Open Skies	UK	France-USA
Ryanair	Ireland	Belgium/France/Germany/UK-Croatia/Morocco Denmark/Norway/Sweden-Croatia Italy/Netherlands/Spain-Morocco
Smartwings	Czech Republik	Slovakia-Israel
Thomson Airways	UK	Ireland-Egypt
Volotea	Spain	Italy-Croatia
WIZZ Air**	Hungary	Italy/UK-Croatia/Macedonia
*) Flights from and to Switzerland are assumed to be operated by easyJet Switzerland and thus not listed here.		
**) In addition, WIZZ Air and its subsidiaries WIZZ Air Kosovo and WIZZ Air Ukraine connect several EU countries with destinations in Ukraine and Kosovo.		

Source: OAG. Routes without open sky agreement are printed in bold type.

The data analysis also reveals that community carrier designation mainly happens on short-haul and not very often on long-haul routes, as Table 1 also shows. On long-haul routes, for instance to the US, airlines seem to concentrate on their home markets/hubs to benefit from economies of scale, scope and density which seem to be crucial here (see, e.g., Caves *et al.*, 1984; Bailey *et al.*, 1986). Hence, it usually makes no economic sense for hub carriers to decentralize (Maertens, 2009).

Table 2. Share of traffic with third countries under horizontal agreements with selected airlines

Carrier		Total Traffic (July 2012)		Traffic with third countries under horizontal agreements		Share	
		Total Flights	Total Seats	Flights	Seats	Flights	Seats
DY	Norwegian Air Shuttle	12,166	2,187,222	290	54,466	2.4%	2.5%
FR	Ryanair	52,596	9,940,644	1,441	272,349	2.7%	2.7%
L9	Belle Air Europe	442	57,136	222	30,960	50.2%	54.2%
U2	easyJet	39,387	6,337,932	619	98,676	1.6%	1.6%

Source: OAG.

This phenomenon could especially be observed after the introduction of the EU-US horizontal open sky agreement in 2008. Following the agreement, new services were only inaugurated in markets that used to be restricted (e.g. US-Spain and US-London Heathrow) but not from countries that already had bilateral open sky agreements with the US. New services by community carriers from places other than their home hub to the US (e.g., Lufthansa flying transatlantic from Italy) were hardly observed. In other words, only the “open sky-aspect” of the new EU-US ASA seems to have yielded some traffic growth, namely in previously restricted markets, but not the removal of the nationality clauses.

4. Conclusion

The European Commission has signed first horizontal air service agreements (ASA) with several countries, in order to bring existing bilateral ASA into legal conformity with the 2002 ECJ judgment on “nationality clauses”. Based on OAG data analyses and literature reviews, we analyse if these new agreements have so far had any positive effects on service levels.

We find that the new horizontal agreements between the EC and third countries have, as such, not yielded in additional traffic supply:

- If capacity restrictions of the bilateral ASA remain in place and when all frequencies allowed in the bilateral are already taken by the incumbent carriers, community carriers will only in theory have the right to start services, but not in practice.
- In open sky markets without any capacity restrictions, a removal of the nationality clause might also not automatically result in the inauguration of new services by community carriers. This observation seems to be valid especially for long haul markets where specific market characteristics restrain carriers from starting services from other places than their respective home hubs.

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Integration of revenue management and pricing systems towards greater revenue optimization in the airline business

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Abstract: During the regulated era, pricing and capacity control have been distinct exclusive functions. The pricing at that time was a simple dichotomy of normal fares and special fares, both specified by the IATA TC. The capacity control unit had no access to the prices of the seats. This scene has totally changed after deregulation (1980s) with airlines' freedom to price their products at varying prices. Despite the economic formulae indicating direct relationship between price and demand for time-sensitive perishable airline products, pricing and capacity control departments in many airlines today continue to function in an isolated pattern. This paper discusses how an effective integration of pricing and revenue management functions could further optimize airline revenues in the contemporary dynamic environment of supply and demand, origin-destination (OD) network connectivity and global economic fluctuations.

Keywords: airline deregulation, revenue optimization, IATA TC (Tariff Co-ordination), pricing, revenue management.

1. Introduction

This is an excerpt of research that was conducted on the current pricing and revenue management methods practiced in the airline industry. This research highlights the gaps in the techniques and processes practiced by pricing and revenue management functional units. Furthermore, it suggests enhancements in the systems, increased co-ordination between the two units, and alignment of the processes towards higher levels of integration, at a systems level as well as at an organizational management level.

2. Airline deregulation

Deregulation opened up the airline business to newcomers which contributed to increased competition and the introduction of discounted fares (IATA 2008). The airlines recognized that almost every empty seat flown had negligible incremental cost associated with it and selling these seats at discounted prices could increase revenues. Consequently, the discounted fares were set to get the lower end of the market, with restrictive fences to prevent dilution from the higher-yielding business segment's revenue contributed by the upper end of the market.

3. Pricing of airline products

Using the concept of Willingness-to-Pay (WTP), airlines divide customers into groups, or market segments, who pay different prices for their tickets. In order to ensure this, some fares have restrictions or dilution preventive 'fences' that prevent dilution of higher yielding fares.

Fences are requirements that the customers must meet in order to qualify for certain low-price tickets. Physical fences include customer and service categories (adult, child or senior citizen); non-physical fences include penalties for cancellations and advance purchase requirements.

Figure 1 shows the availability (days prior to departure) and the minimum stay requirement for six typical fares. In this example, business fares are available up to departure and have no minimum stay requirements. VFR (visiting friends and relatives) fares, on the other hand, are only available up to 7 days prior to departure and require a minimum Saturday night stay and a maximum 90-day stay.

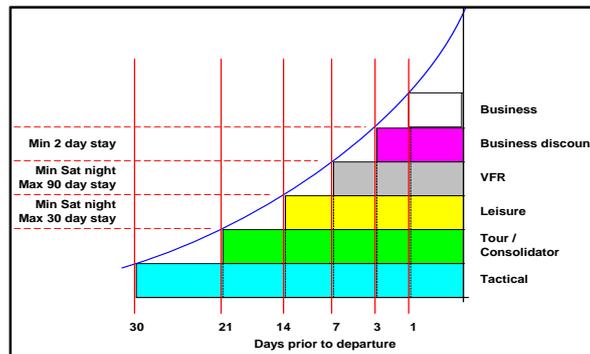


Figure 1. Advance purchase and minimum stay requirements for different fare types (Parker 2007)

Airlines consider a number of factors when setting ticket prices. These include (a) the cost of providing the services, (b) a ceiling price for each market segment based on market sensitivity to different prices, based on the value of service in the eyes of the customers and their willingness and ability to pay, (c) competitor prices and activities, (d) economic conditions in the market, and (e) behaviour of the customers.

4. Revenue management systems

The method of seat inventory control by optimizing the seat allocations by booking class for each flight leg independently is known as leg-based seat inventory control. This approach of RM is popular in the industry and is believed to increase airlines' revenue by 2 to 5 *per cent*. Maximizing revenue on an each flight leg, however, does not ensure that the revenue is being optimized at the network level for full service network carriers.

Airlines that use highly evolved RM systems are working towards developing and implementing systems that can provide Origin-Destination (O&D) control along with all the existing RM capabilities (Belobaba, 2009). The goal of O&D seat inventory control is to optimize revenues over the network as a whole by evaluating the passengers, fares, and itineraries that generate higher revenue. This would involve the capability of giving preference to long-haul, connecting passengers over local traffic when they generate higher revenues to the network, as well as the capability of discerning local single-leg customers over a long-haul connecting passenger request. The most common approach to O&D control is the "bid price" control. The O&D control accepts or rejects a passenger itinerary request based on bid price of each flight leg in the O&D itinerary. This approach is based on the marginal value of the lowest valued available seat on any flight leg at a given point in the booking time window.

5. Sub-optimization issues of "Disintegrated and isolated pricing and RM units"

The recent emergence of "less restricted fare structure" initiated by the LCCs has made the network carriers replace the well-built market segmentation with 'weak' market segmentation by

the dynamic management of fares. The original forecasting and optimization models worked under the assumption that demand of fare class was independent of each other, given that the fare rules prevented the revenue dilution. With the shift towards less restricted fares, customers are expected to purchase the lowest available fare that stimulates demand. Nevertheless, it should be noted that removing the restrictions on the fares for fare structure simplification would result in loss of revenue for traditional carriers. As the airlines move towards lesser restricted fare structures with multiple price points range, RM systems would play a crucial role in maximizing the airlines revenues (in this frame work).

RBDs (Revenue Booking Designators): an industry term for booking classes enables airlines to consider a number of factors when setting ticket prices and fares and rules associated with each price. RM systems forecast the bookings expected in an RBD based on historical booking data without considering the fact that fares might have changed (from historic data). With the use of RBDs, the RM systems do not fully match “price elasticity of demand” since the limit of 26 RBDs limits price points to 26. This, in turn, limits further the capability to determine the exact point where the fares become elastic in various markets. In other words, the interdependency of prices and demand is not reflected in this model.

It has been observed that in many airlines that RM exists as a separate business unit with no common chain of command with pricing functions, although volume and pricing are related variables in empirically established economic theories (see Figure 2).

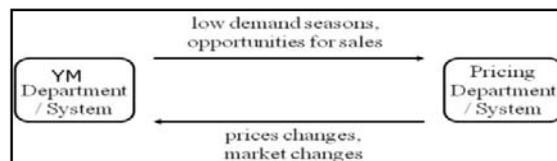


Figure 2. YM and pricing co-ordination

This is common amongst legacy airlines for historical reasons, as the current airline pricing departments have grown from the former tariff departments (of the pre-regulated era) which performed the formal tasks of filing IATA rate agreements with government authorities. In a similar pattern, the current RM departments have evolved from reservation control and CRS (Central Reservation Systems) groups composed of specialized reservations agents who performed such administrative tasks, as manually setting overbooking limits and priority of space confirmation not based on yield, but on first-come-first-served basis.

6. Research methodology

This research used *quantitative approach* to seek industry expertise on the following:

- 1) if the current fare products and associated rules need simplification,
- 2) is there a need to move from the traditional booking class approach to a fare-buckets approach to get more fare levels and dynamism in pricing, and accuracy in forecasts?

The respondents chosen were forecasting and pricing experts in the industry from different airlines in the Middle East. Figure 3 shows the details of the survey conducted.

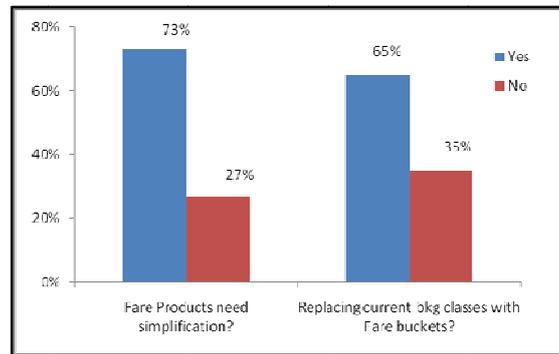


Figure 3. Survey responses

The majority of the responses indicated the need for change in fare structure and rules of full service carriers towards simplification. The responses also stated the need for moving from the current booking class structure to the fare-buckets approach which would provide more flexibility to airlines on the number of fare levels as well as providing more accurate forecasts for each fare bucket, instead of having it on a class level, the value of which would change from season to season.

The qualitative approach used was in the form of personal interviews of the industry experts to study if airlines needed more fare levels and the booking class limit of 26 alpha codes. Some of the respondents indicated under-utilization of technology in the airline industry. Today's technological advances enable an airline to charge a different price for every seat, thus making older industry standards used by legacy carriers sub-optimal.

7. Integrated approach to pricing and revenue management

As the airline market is now deregulated, and more dynamic and complex, it is necessary that the functions of these departments are fully synchronized to benefit from sophisticated RM models. Based on the gaps discussed and the outcomes of the research analysis, recommendations have been classified into two categories:

(1) *Systems enhancements*

- The “fare buckets” approach can be used to replace RBD as an entity of forecast dimensions. Airlines with advanced RM systems use PNR data for forecasting purposes. Extracting fares data from the PNR ticketing details will aid in forecasting at fare buckets level.
- Once an O&D forecaster has derived forecast values at OD/POS/fare buckets level, this is passed to the “price elasticity model” to re-compute the demand of each fare buckets based on the customer choice model, which can find out how much of the demand in one fare bucket is willing to move to a higher fare bucket based on the price elasticity, thus taking into account the interdependency of prices and demand (see Figure 4).

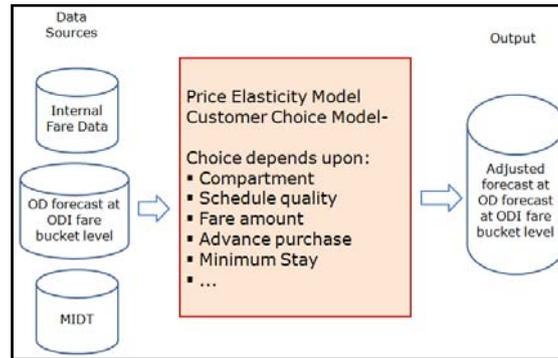


Figure 4. Price elasticity model.

- The market size/share model considers the interdependency of demand for all alternatives available to the customers in the market (i.e., competition). Using the MIDT data and the demand calibrated by the price elasticity model, the market size/share model analyses the changes in the market share and adjusts the OD forecast accordingly (see Figure 5), thus incorporating the market changes into forecast automatically and dynamically.

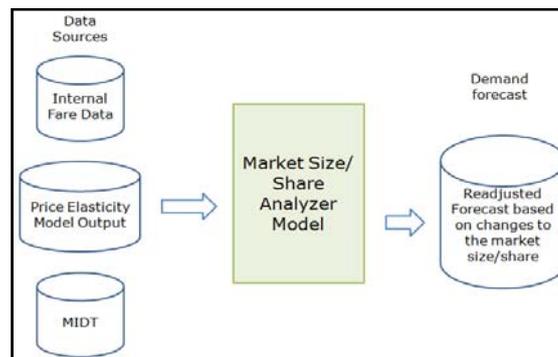


Figure 5. Market size/share model.

- The output of this model is given to the O&D optimizer which does the optimization and generates bid prices which take into account the changes in the market conditions and relationship of price and demand. Figure 6 shows the complete flow process diagram.

The traditional airlines have a static method of pricing in the current scenario, i.e., pre-defining prices and products, and supplying this information beforehand to the various distribution channels. In order that the prices remain competitive, however, airlines need to do pricing more dynamically. Thus the concept of *Dynamic Pricing* helps the airlines to react to the changes in the market quickly without losing out on the market share. Once the forecast accuracy is achieved using the above methods this changes in the forecast/market share should dynamically trigger changes to the pricing.

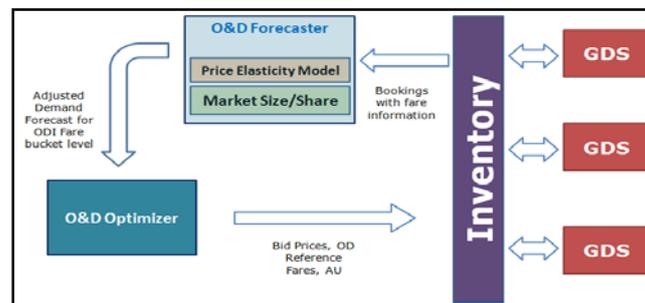


Figure 6. Integrated approach to RM and pricing

(2) Departmental Changes

Possession of sophisticated YM and pricing systems which have good co-ordination between them is not enough for an airline to optimize revenues in the best possible way. In many cases the ideal organization consists of teams of revenue management analysts, each of whom manages both prices and seat inventory control/demand for a single route area. Ideally, a single unit should manage the pricing and inventory for each market (served by the airline).

8. Conclusion

In today's competitive environment, an airline can achieve an advantage over competitors by taking a dynamic approach to pricing and moving from booking classes to fare buckets as a step to simplifying the pricing structure and taking advantage of more price points. The suggested approach enables the airline to remain competitive in the market and react quickly to any changes in the market conditions. It is evident from this study that merely procuring sophisticated RM systems does not necessarily maximize revenues in the optimal manner. It is the processes and the organizational level integration of the pricing and RM departments that effectively contribute to overall revenue optimization.

This research finding indicates that utilization of new, choice-based pricing models and revenue optimization using competitive information along with real-time decision-making is likely to benefit all carriers in terms of enhanced financial performance, operational excellence and customer satisfaction.

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Nuclear synergy in aviation: a discussion paper

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Abstract: Aviation has always required its players to innovate and adapt in order to remain competitive in a precarious industry known for its razor-thin profit margins continuously challenged by fluctuating fuel prices, terrorism, employee strikes and the inevitable exhaustion of fossil fuel. In this discussion paper the authors suggest the incorporation of nuclear energy as an alternative source of power generation within the burgeoning hub of the soon-to-be world's largest airport, the Al Maktoum International Airport Dubai, and a further coupling of the airport's nuclear station to the world's largest desalination plant in Jebel Ali.

Keywords: nuclear energy, peak oil, alternative energy, fossil fuel, airport operations.

1. Introduction

The energy crisis is more relevant today than ever before, with the situation bound to deteriorate due to looming Peak Oil (Planet for Life, 2010; Kuhlman, 2007). The aviation industry has taken a massive dent in profitable operations, due singularly to this energy crisis and if not for the large scale hedging efforts, even today's carrier giants would have been crippled leaving to a void in aviation (Carter *et al.*, 2003; Chiu & Ng, 2012).

Today, airlines on a global scale are concerned about the environment and energy crisis, and have begun implementing 'Go Green' concepts as part of their corporate social responsibility towards battling and improving their current carbon footprint. According to Paul Steele, the Executive Director of Air Transport Action Group, there is no other industry that is doing more to reduce its carbon emissions (ATAG July, 2011).

The world's airlines spent a staggering USD 140 billion on jet fuel alone in 2011 (ATAG September, 2011), and this figure does not even reflect the amount of energy consumed on ground servicing and airport operations. Each unit of power used materializes from their respective national grids and therefore have to be accounted for in the costs of power usage by the aviation industry. The Middle East and Asia are extremely significant in this regard, as not only are they the next emerging markets in aviation, but they lack the energy diversity and flexibility the west boasts of, and their main source of power generation is still burning fossil fuels. There is a commitment to reflect and continue validating Steele's belief in this industry; as an industry we need to minimize our dependence on fossil fuels and cultivate innovation and technology in our path towards the future. The key to this challenge is held in the integration of nuclear power plants and airport operations.

Electricity, although revolutionary, has always been a scarce commodity in a world with perpetually increasing demands. Nuclear dependence is the next obvious step, with 15% of globally available electricity already coming from nuclear energy (World-Nuclear, n.d.). Practical nuclear synergy in aviation is still in its infancy with bilateral agreements between China and France being the first real instigators of a nuclear future for aviation (China Daily,

2010). Implementation, however, is a distant hope without a pioneer to materialize this possibility.

2. Scope of nuclear energy in Dubai

Emirates Airlines is a torch bearer in what it perceives to be the future of aviation, the 'hub and spoke system'. Through its infrastructure and operation, Dubai has cemented itself as an unrivalled hub of tomorrow and is set to solely parent that niche. The perfect aid to this mantle is Dubai World Central's Al Maktoum International Airport, which upon completion boasts to be the world's largest airport. If Emirates Airline is a true reflection of Dubai, its strive for excellence and ambition to provide a unique, unparalleled service is exactly why Dubai is ideal for such a revolutionary adaptation, from conventional power sources to a certain nuclear future synergized with airport operations (Dubai World Central, 2011).

The Dubai World Central project mirrors the regional development schemes and validates the predicted 10% annual growth in demand for electricity through to 2015. Limitations to renewable sources of energy, control on pollution and freedom from oil and gas dependency are the reasons why the World Nuclear News (WNN) identified nuclear energy as the most viable solution. According to the WNN, nuclear power 'emerged as a proven, environmentally-promising and commercially-competitive option which could make a significant base-load contribution to the UAE's economy and future energy security' (Schell, 2010).

The UAE has seen a potential nuclear future for itself and is taking deliberate steps in close consultation with the International Atomic Energy Agency to embark upon its own nuclear power programme. The UAE's nuclear project will see up to four reactor sites as soon as 2020, with Evolutionary Power Reactors (EPR) readily generating 1650+MWe (AREVA, 2012).

Undoubtedly this implementation will bring about its own set of challenges, especially with the coupling concept of powering the world's largest airport. The risks are dauntingly high given the form of energy production. The project needs to look past the obvious gains and look to maximize the project potential, enabling the drawbacks to be outweighed. Desalination is the primary means of potable water for the UAE with Jebel Ali housing the world's largest desalination plant, responsible for most of the available water. The desalination plant is currently in conjunction with power generation and the demand is expected to rise yearly by 8% till 2015 (World Nuclear Association, 2012). This increasing demand and limited resources have been cited for the diversification of energy resources.

Al Maktoum International Airport with Dubai World Central is the ideal pilot project to implement a nuclear plant which is further complemented, justified and validated by the world's largest desalination plant. The UAE itself is set to see the cost of building, operating and maintaining desalination plants rise over USD 3 billion by 2016 (Emirates 24/7, 2010) when the Global Water Summit in Paris, April 2010, witnessed numerous leading water experts supporting the prospect of integrating desalination plants with nuclear power plants to cut costs. The technology already exists with Japan pioneering this coupling, and the close proximity between the two proposed sites will enable maximum cooling and power transmission at a minimal cost and marginal power loss. Nuclear desalination is extremely cost-competitive when compared to fossil fuel desalination and can be as low as USD 0.40 for desalinating 1m³ of sea water (Faibish & Konishi, 2003). This is due to its ability for co-generating electricity with hot sea water fed from the cooling systems, and the UAE's joint venture policy is ideal to extract the foreign expertise required for such a coupling (World Nuclear Association, 2012; Environmental

International Consultants, 2009; World Nuclear Association July, 2012; Craig, 2006; BI-ME, 2007).

3. Associated Issues and Risk Analysis

The fact that over 430 commercial nuclear power reactors are currently operating in 31 countries clearly demonstrates that the barriers against nuclear energy can be challenged in a secure manner (World Nuclear Association April, 2012). History lays testament to the consequences of failure: the events of Chernobyl and Fukushima have left society infused with a sense of hesitancy towards anything nuclear. It is therefore important to identify the potential risks prior to building a nuclear plant, so that they can be addressed adequately.

Man truly is his own mortal enemy and therefore terrorism is a major concern with nuclear energy. Given the recent political unrest and the Arab Uprising (BBC World News, 2012), the threat of terrorism is definitely far greater in the Middle East. In contrast, however, the political and civil status of Dubai and the UAE has always been neutral, thus alienating the country from the threats the Middle East poses within its borders.

High levels of radioactive exposure are lethal, and factors such as distance from urban centres, disposal of nuclear waste, good water supplies for cooling, the absence of natural hazards, good transport links, and proximity to both civil airports and military installations must be addressed during a feasibility study of a nuclear plant.

Since the proposed nuclear plant is in close proximity to the airport, it becomes crucial to observe normal flight paths and flight operations, as more than 75% of air crashes are reported to occur close to take-off and landing (1001 Crash, n.d.), therefore close attention is required when choosing the ideal place for this nuclear plant.

Every increase in distance from the airport will attenuate power transmission and risks rendering the operation uneconomical. Conversely, a safe distance from urban centres is one of the main safety factors in case of an emergency, with an earlier consensus towards locating nuclear plants as remotely as possible from cities (The Deciding Factor, n.d.). Second generation power plants changed this view, and now plants may be relatively-safely located closer to where this output is required. The safety net in nuclear power generation was further enhanced by the 3rd Generation EPR plants as they are not only safer but also far more competitive (AREVA, 2012). Taking this into consideration the Al Maktoum International Airport is located approximately 40 km from the Dubai city centre, making its location truly ideal both in terms of travel proximity and safety (Al Maktoum International Airport 2009; The Deciding Factor, n.d.).

It is vital for both the building and maintenance of nuclear power stations to have good transport links; the 140 sq km airport will have the region's first integrated multi-modal transportation platform connecting air, sea, and land. The Jebel Ali Port and Free Zone will act as an asset and will make air – sea connectivity achievable in as short as four hours (Dubai Airports, 2012; airport.ae, n.d.).

Considering protection from natural disasters, the UAE is far less susceptible in relation to the established nuclear giants of today (Black, 2011). One of the major deciding factors for having a nuclear reactor in the Middle East, however, would be the heat. Since the maximum temperature could rise to well over 35°C in most months (Dubai Airports July, 2012), the reactor is going to need sufficient cooling facilities. The coupling of the nuclear plant with the desalination plant is therefore strategic, as it should be able to provide and satisfy the necessary cooling requirements.

4. Conclusion

Nuclear synergy in Aviation is by no means a simple order, and once the integration begins, it will undeniably present a unique set of challenges. The authors discuss powering airports and ground operations as the ideal means by which to utilize nuclear energy at this time, and as the start that aviation needs to forge ahead towards a fossil-fuel-free future. The Al Maktoum International Airport model, with nuclear integration, will not only stand as an innovative example but also demonstrate the flexibility and foresight a fossil-fuel-rich country has to release its consumption of its own raw materials and provide a sustainable future for itself as well as for the industry. If implemented, the Al Maktoum International Airport would be maximizing the available cutting-edge technology and in time will reap the economic benefits of this innovative move.

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Biofuel: no longer a myth for the aviation industry

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Abstract: Due to skyrocketing fossil fuel costs and their predictable depletion, aviation authorities have become interested in power fleets with alternative fuels such as biofuels. These have led to the establishment of biofuel regulatory bodies and have encouraged funding towards biofuel research. This paper provides an overview of the production of the most promising biofuels. The commercial flights using these biofuels are listed as demonstrating that their usage is no longer a myth. Although recently the number of private biofuel research projects has increased drastically, to ensure a large scale production governments and stakeholders must get fully involved and encourage airlines to use biofuels.

Keywords: alternative fuel, second generation biofuels, aviation biofuels, ASTM certification.

1. Introduction

The first simple jet engines were developed just prior to and during the early part of World War II. Hans von Ohai developed the first successful aviation turbine engine powered by gasoline. Sir Frank Whittle developed then an aviation turbine engine using illuminating kerosene since gasoline was running short during the war (Air BP n.d.). The Whittle engine became the forerunner of jet engines and kerosene remains the primary jet fuel that powers today's fleets. Kerosene may not remain as a primary choice in the future, however, due to fossil fuel cost and scarcity. Therefore, the use of biofuels has been on the radar screen of authorities and stakeholders. Another main reason authorities are interested in using biofuels is because it would aid airlines in achieving their target of improving fuel efficiency by an average of 1.5% per year between 2010 and 2020 and their commitment to cap their net carbon emissions beyond 2020 (Bisignani 2009). This discussion provides an introductory glimpse into the world of biofuels that could assist airlines to achieve a more positive economic and environmental efficiency. In addition, the benefits and challenges of using the most promising biofuels are highlighted.

2. Biofuel basics

Biofuel is biomass converted into liquid fuels for transportation purpose. Biomass is bio-material containing stored energy from the sun and is derived from living, or recently living organisms. Biomass can either be a waste product or grown in the form of crops (Rogers 2011). Fossil fuels are ancient plants so they are not considered as biomass because they contain carbon that has been captured millions of years ago. Therefore, combustion of fossil fuel disturbs carbon content in the environment by returning the carbon that was taken a long time ago (NREL 2012). Burning biomass releases about the same amount of carbon as burning fossil fuels. The use of biomass, however, has the potential to greatly reduce greenhouse gas emissions because it releases carbon dioxide that is balanced by the carbon dioxide captured during its own growth (NREL 2012). IATA, which is working with industry partners towards biofuels' certification and requirements, specifies that biofuels should be made from either non-food biomass or from

municipal waste and should not cause any negative environmental impacts (IATA 2011). In addition, biofuels must meet the same specification as conventional jet fuels and mix well with the jet fuel (referred to as ‘drop-in-fuel’). Biofuels, therefore, have to be approved for aviation usage.

Currently biofuel regulatory bodies which set criteria for industrial applications are the Renewable Energy Directive (RED) in Europe and the Renewable Fuel Standard (RFS) in the US (IATA 2011). On the global level, ASTM International (formerly known as American Society for Testing and Materials) is a recognized leader in the development of international biofuel standards (IATA 2011). There are several other existing organizations that recommend standardizations.

3. First and second generation biofuel

There are two categories of fuels: the first is derived from food crops and the second is derived from sustainable resources. The first generation is not suitable for large scale purposes because it uses feedstock from the food chain affecting consumers and the environment negatively. Large scale planting of it also has a negative impact on agriculture (ATAG 2009). An example is Ethanol which is produced from corn and sugarcane. It is not an ideal aviation fuel because it does not mix well with jet fuel, is corrosive and does not provide enough energy for heavy aircraft (Bomani *et al.* 2009). Biodiesel, another first generation fuel, is usually produced from vegetable oils and also not suitable for aircraft engines (Bomani *et al.* 2009). Therefore, the aviation industry is looking at the next generation of fuel instead.

The new generation of fuel must neither impact the environment negatively, nor compete with food sources. In addition, it must be suitable for current aircraft infrastructure. The potential feedstocks for second-generation biofuels production considered in this paper are the most promising: bio-butanol, cellulose, jatropha, camelina, halophytes and algae.

Adding a few more atoms to ethanol produces butanol, which is less corrosive and creates more energy – about 90% of that of petrol. Today's fuel blends don't exceed 10% ethanol, but a fuel blend of 50–70% of butanol is possible. The challenge is that microorganisms produce butanol in tiny quantities. A chemist at Berkeley has induced microbes to produce butanol tenfold more in the laboratory. Several companies are trying to commercialize butanol or isobutanol production. Another benefit is that its production is cheaper than ethanol because the water produced from butanol production could be separated easily (Savage 2011).

Another way to produce ethanol is from cellulose found in plant cell walls. Cellulosic ethanol can be produced from agricultural/wood wastes. This method is attractive as the feedstock is cheap and abundant. According to the US Department of Energy, ethanol produced from corn only provides 26% more energy than the energy required for its production, while cellulosic ethanol gives out 80% more energy (Bomani *et al.* 2009). One of the challenges with this technique is that feedstock must be available in a large volume and the cost of converting cellulose to ethanol is high. Renewable energy sources may provide the required energy for ethanol production. Ongoing research for aero-transport is investigating this technique.

Jatropha, a tree native to Central and South America, is an extremely efficient biofuel feedstock as it grows in unfavourable conditions. Its seeds contain from 30 to 40% oil and are not a food source. Jatropha biofuel provides many environmental benefits yielding 20 times the energy required to produce it. A Boeing study found that if jatropha were planted on degraded land that was not in use, carbon emissions reductions can exceed by 60% when compared to traditional fuel (Lane 2011). An Aeromexico Boeing 777 successfully completed a transatlantic

flight using a 30/70 blend of jatropha-based and traditional fuel in 2011 (Nichols 2011). In the same year, Interjet (a Mexican airline) used jatropha between Mexico City and Tuxtla Gutierrez. There have been several non-commercial flight demonstrations using this plant oil (Nichols 2011).

Camelina is an oilseed crop within the flowering plant family *Brassicaceae* native to Northern Europe and Central Asia. Camelina's suitability to northern climates allows it to be grown in areas that are unsuitable for other major crops. This plant is often grown as a rotational crop. It, therefore, provides an opportunity to diversify a farmer's crops and its production would not displace another crop (EPA 2012). In June 2011, two flights fuelled by a blend of camelina-based jet fuel and traditional jet fuel flew from the US to Paris. Another example is Iberia airline which flew an Airbus A320 from Madrid to Barcelona on a 25/75 fuel blend in October 2011 (ICAO 2011). In addition, an American Air Force F-22 has flawlessly broken the sound barrier operating on a 50/50 blend. There have been several other non-commercial flights operating on similar blends.

Halophytes are another plant that can survive hard condition growing either in salt water or alkaline semi-deserts. They can absorb water from soils and from seawater that non-halophytes could not handle. Approximately 211 out of 885 species are in the Middle East (Bomani *et al.* 2009) so this plant could be of interest to airlines based in the Middle East. Boeing, Honeywell and Masdar Institute of Technology in Abu Dhabi have announced a major project to start investing in research towards creating Halophytes as a potential biofuel for aviation and other transport means in the future (Masdar Institute 2010).

Algae are the most promising feedstock for producing large quantities of aviation biofuel. They are adaptable to polluted/salt water and harsh conditions. They live off carbon dioxide, which makes them ideal for taking the carbon from sources like power plants. They grow fast and the oil yields are orders of magnitude higher than other biofuel crops (Bomani *et al.* 2009). The challenge with algae is finding a strain with significant lipid amount. In addition, the oil is mixed with water which must be separated. The algae grown in a controlled environment is more promising but more expensive (Bomani *et al.* 2009). Further research activities in this area are required. United Airlines flew a B737-800 from Houston to Chicago using a 40/60 blend of algae-based biofuel and traditional fuel on 7 November 2011 (ICAO 2011).

4. Approved biofuel

ASTM has only approved 'drop-in-fuels' which are obtained either *via* Bio-SPK (Bio Synthetic Paraffinic Kerosene) or *via* FT-SPK (Fischer-Tropsch-SPK) routes. The latter approach, which was approved in 2009, processes solid biomass to liquid through the Fischer Tropsch chemical process: first biomasses are converted to synthetic gases which are then transformed into liquid-hydrocarbons (IATA 2011). The other approved processes, Bio-SPK, uses bio-based oil (Jatropha, algae and camelina) or waste oils for SPK production (by cracking – a process that breaks larger hydrocarbons into smaller chains – and hydroprocessing). ASTM in 2011 approved a mixture of 50% jet fuel and 50% Bio-SPK (IATA 2011). On 12 January 2012 Lufthansa landed in Frankfurt from Washington carrying approximately 40 tons of biofuel mix mainly based on camelina oil, with some jatropha oil and animal fat. CO₂ emissions were reduced by about 38 tons on this flight. This flight was the final trial that Lufthansa took part in: 1,187 domestic flights between Frankfurt and Hamburg using a 50/50 blend of regular fuel and biosynthetic kerosene in one of its planes from mid-July to the end of December (Nichols 2012).

5. Summary

There are other technologies in the distant forecast such as hydrogen-powered planes and nano-technology approaches as a potential safe way for air transport. The biofuels discussed in this report have, however, become part of aviation reality (refer to the summary table, Table 1). Great progress has been witnessed for a greener aviation in the past few years as the number of bio-fuel “activities has increased from 11 in 2009 to over 300 in 2011” (IATA 2011). Most importantly, few stakeholders have already targeted to use 25% biofuel by 2015.

Table 1. Biofuels which were used successfully by the aviation industry

Biofuel	Airline/Company	Flight information	Biofuel/Traditional fuel-blend
Jatropha	Aeromexico	Mexico city to Madrid	30/70
Jatropha	Interjet	Mexico City to Tuxtla Gutierrez	27/73
Camelina	Honeywell	New Jersey to Paris	50/50
Camelina	Boeing	Everett, W.A. State to Paris	15/85
Camelina	Iberia	Madrid to Barcelona	25/75
Camelina	US Air Force	F-22 broke the sound barrier flawlessly	50/50
Algae	United Airlines	Houston to Chicago	40/60
Bio-SPK	Lufthansa	1,187 domestic flights between Frankfurt and Hamburg . Final trial was on a flight from Washington to Frankfurt	50/50

6. Recommendations

The main challenge today is to produce these fuels on a large scale for commercial purposes. The key is to reduce the biofuel production cost in order to encourage airlines using them. It is not within scope of this paper to discuss how this could be achieved. Implementing biofuels usage for air travel is much easier than ground transport as there are millions of vehicles compared to the thousands of operating aircraft. It is worth mentioning that further research is the pillar for setting the foundation for achieving the most economical and eco-friendly approach required for commercial usage. Although many private sectors have provided funding for biofuel research, it is essential that governments and aviation authorities get fully involved and encourage major airlines to be open to the idea of using these biofuels. Once many airlines commit to the idea, joint purchasing agreements could be introduced, experiences could be shared, and unified international fuel certification could be put into practice.

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The relationship between South African aviation policy in Africa and air passenger traffic flows

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Abstract: The Yamoussoukro Decision to date remains the single most important air transport reform policy in Africa, the continent-wide implementation of which remains pending. This study investigates the impact of the South African pro-Yamoussoukro Decision aviation policy on air passenger traffic flows over an 11-year time period in five markets, the intra-African, the SADC, West, East and North African regional markets. The aviation policy is reflected in the design of bilateral air services agreements through the market access features and measured by the Air Service Liberalisation Index. The results show that the significant predictors differ in each of the five markets.

Keywords: aviation policy, ALI, traffic flows, BASAs, liberalization, South Africa, Africa, Yamoussoukro Decision.

1. Introduction

Over a number of decades the global aviation industry has moved from highly regulated to more progressive by the gradual removal of regulatory restrictions in aviation policies, and new liberal trading agreements (Department of Transport, 2008:1-3). These changes have been driven by numerous robust dynamics such as privatization, regional integration, globalization, consolidation as well as deregulation and liberalization, taking place in the major air markets of the world. The result of this liberalization has been seen in the increase in air passenger traffic flows in various regions of the world (Myburg *et al.*, 2006; InterVISTAS-ga² Consulting, Inc., 2006; Warnock-Smith & Morrell, 2008; Piermartini & Rousova, 2008, 2009; InterVISTAS-EU Consulting, Inc., 2009; Schlumberger, 2010; Grosso, 2010). Although some researchers have paid attention to liberalization of the African skies and its impact on commercial air traffic and tourism (Myburgh *et al.*, 2006; Mills & Membreno, 2007; Mills & Swantner, 2008; Schlumberger, 2010), little is known about the relationship between South Africa's aviation policy in Africa and air passenger traffic flows. This study focusses on this topic and the primary purpose can be stated as the assessment of the impact of South Africa's aviation policy in Africa, as reflected in the design of its bilateral air services agreements (BASAs), on air passenger traffic flows over a selected time period. The time period selected is 2000 to 2010 which is linked to the adoption of the Decision in 2000 and the air services liberalization targets with African states as set by South Africa in its aviation policy for 2010.

2. Literature review

The deregulation of the South African domestic aviation market in the early 1990s resulted in a proliferation of low-cost airlines and increased passenger volumes, increasing airline competition and making domestic air travel more affordable (Myburgh *et al.*, 2006:8). As far as the intra-African aviation market is concerned, it has been more than a decade since the African leaders agreed to liberalize the market through the Yamoussoukro Decision (YD). The Yamoussoukro

Decision entered into force in 2000 and became fully binding in 2002. The full potential of the Decision has not yet been realized however, and, to-date, its continent-wide implementation remains pending. The South African Government's actions have been directed at speeding up the implementation of the YD objectives with like-minded states and they illustrate the importance of stimulating trade and tourism on the Continent by having adopted a more liberal approach to the regulation of air transport (Department of Transport, 2008:1-3). South Africa's aviation policy towards intra-African liberalization has been clearly defined in the Airlift Strategy of 2006 which includes five-year liberalization targets for the implementation of the YD through modernizing key elements of BASAs such as designation, tariffs and code-sharing. The aviation policy has been aligned with other government policies and strategies such as the Tourism Growth Strategy (Department of Transport, 2006:31) and supported in the Airlift Implementation Plan. The South African government has also taken a pro-YD position at the numerous assemblies.

The benefits of more liberal aviation policies on passenger traffic in various regions of the world has been shown in a number of studies such as InterVISTAS-ga² Consulting, Inc. (2006), Myburgh *et al.* (2006), Warnock-Smith & Morrell (2008), Piermartini & Rousova (2008, 2009), InterVISTAS-EU Consulting, Inc. (2009) and Schlumberger (2010). Air passenger traffic flows are not only dependent on aviation policies and elements of the BASAs, other factors also play a role, *inter alia*, the size of the GDP, population size, magnitude of the services trade flows (InterVISTAS-ga² Consulting, Inc., 2006; Myburgh *et al.*, 2006; Warnock-Smith & Morrell, 2008; Piermartini & Rousova, 2008, 2009; InterVISTAS-EU Consulting, Inc., 2009; Schlumberger, 2010). In order to achieve the purpose of the study the following hypothesis was formulated:

H₁: There is a simultaneous impact of the degree of liberalization of bilateral air services agreements, the number of years the BASAs have been in place, the size of the GDP, the presence of a low-income country in a country-pair, the magnitude of the services trade flows and the population size on the South African – intra-African air passenger traffic flows.

3. Methodology

In order to quantify the impact of the degree of restrictiveness or openness of the bilaterals among South Africa and its bilateral air services counterparts on air passenger traffic flows, this study used the Air Liberalisation Index (ALI) as developed by the WTO. In essence, the ALI is an informed index of the degree of liberalization of air services for passenger traffic, whereby different provisions, pertaining to market access features of BASAs, namely grant of rights, designation, withholding or ownership, capacity clause, tariffs, statistics and co-operative arrangements, are weighted on the basis of their importance in removing obstacles to trade in air services according to the judgments of experts in the sector.

There are four variants of the ALI weighing system, namely standard (STD), fifth freedom traffic rights (5th+), withholding/ownership (OWN+) and multiple designation (DES+). The last three have been developed by the WTO to accommodate three specific geographical and economic situations that appear to be relatively frequent and that may influence the commercial importance of the different market access features of bilaterals. By categorizing the different provisions in BASAs and assessing them within a scoring system, the ALI provides a simple quantification of the regulatory system in place. The value of the ALI ranges between zero for very restrictive agreements to 50 for very liberal ones (World Trade Organisation, 2006). This method of measuring the restrictiveness of regulation has been shown to be consistent with

results of other statistical methods, such as factor and cluster analyses (Piermartini & Rousova, 2008). The objective of the quantitative research was to statistically measure the impact of the South African aviation policy in Africa on air passenger traffic flows. However the impact, as measured by the ALI index through the design of its BASAs, could not be tested in isolation as a number of other identified predictors played a role. These were (1) the number of years the BASAs have been in place, (2) the size of the GDP, (3) the presence of a low-income country in a country-pair, (4) the magnitude of the service trade flows and (5) the population size.

The data for the study for the period 2000 to 2010 constituted a panel set of 45 cross-sections or African states, each linked to one of the four regions in Africa (SADC, North, West or East Africa). This should result in a panel of 495 observations. However, three countries, namely Liberia, Somalia and Zimbabwe had missing data for a number of years and were therefore omitted from the regression analysis.

The final regression output contained 42 cross-sections, pertaining to five scenarios: the intra-African market (42 countries), as well as the SADC (13 countries), West African (17 countries), East African (seven countries) and North African (five countries) regional markets. A fixed one-way panel regression technique was applied to each of the markets, accounting for the four variants of the ALI, namely *STD*, *5th+*, *DES+* and *OWN+*. The observations within each panel were dependent, but independent from the other panels or African states.

4. Results

The coefficient of determination or R-square value for modelling the South African – intra-African market returned a value of 0.976, which indicated that, for all four variants of the ALI weighting system, 97.6% of the variability of air passenger traffic flows was explained by the six predictors. The coefficient of determination was also found to be extremely high for each of the regions, irrespective of the ALI variant. The results of the F test, testing the significance of the panel regression model for all four variants of the ALI for the five markets were found to be statistically significant indicating that there was a simultaneous impact of the six predictors on the dependent variable $\ln(\text{Traffic})$ for the intra-African market, as well as for the regional markets, irrespective of the ALI variant used. Six predictors were identified to test the significance of their simultaneous impact on air passenger traffic flows in the context of the five identified air transport markets. The results of the panel regression model, for all four variants of the ALI, represented by a full panel of 42 African countries over the 11 year time period, are presented in Table 1.

In the South African – intra-African market, only three predictors, namely the $\ln(\text{Trade})$, *ALI* and $\ln(\text{GDP})$, were found to be statistically significant at the 5% level of significance. In the South African – SADC regional market, three predictors were found to be statistically significant, namely the $\ln(\text{Trade})$, $\ln(\text{GDP})$ and the *ALI*. Although the F-test confirmed that the model was statistically significant in the South African – West African regional market, none of the specified six predictors were found to be significantly different among the countries. Therefore, the null hypothesis cannot be rejected.

Table 1: Panel regression results for the four variants of the ALI in the South African – intra-African market

Predictor	Partial regression coefficient				t-value				p-value			
	STD	5 th +	OWN+	DES+	STD	5 th +	OWN+	DES+	STD	5 th +	OWN+	DES+
Intercept	-24.93	-24.00	-24.36	-25.09	-1.31	-1.26	-1.27	-1.32	0.192	0.210	0.203	0.189
LowInc	-0.09	-0.09	-0.09	-0.09	-1.19	-1.21	-1.23	-1.17	0.235	0.227	0.219	0.241
ASAage	0.02	0.02	0.02	0.01	0.67	0.70	0.71	0.66	0.501	0.483	0.476	0.513
lnTrade	0.32	0.32	0.32	0.32	4.64	4.68	4.64	4.62	<.0001	<.0001	<.0001	<.0001
lnPopulation	0.74	0.71	0.72	0.74	1.26	1.21	1.23	1.28	0.207	0.228	0.218	0.203
ALI	0.01	0.01	0.00	0.01	2.21	2.26	2.16	2.27	0.028	0.025	0.032	0.024
lnGDP	-0.24	-0.24	-0.24	-0.23	-2.84	-2.88	-2.85	-2.81	0.005	0.004	0.005	0.005

Source: Department of Statistics, University of Pretoria (2012)

Note: The p -value in the table is the p -value of the t-test for the significance of a predictor.

Four predictors were found to have a statistically significant impact on air passenger traffic flows in the South African – East African regional market, namely the *Low_Inc*, *ln(Trade)*, *ALI* and *ln(Population)*. In the South African – North African regional market, only one predictor, the *ln(GDP)* was found to have a statistically significant impact on air passenger traffic flows, painting a completely different picture to the South African – Intra-African market, as well as to the other three regional markets.

5. Concluding remarks

Air policy liberalization can be seen as a supply stimulus which may or may not have an effect on the actual supply levels (ICAO, 2004). This is partly due to specific network characteristics and complex supply and demand interactions. For example, a decrease in the GDP levels in the country of origin can lead to a decrease in air passenger traffic flows, even though the fares are reduced and service levels are increased between the country-pair. Hence, the panel regression analysis in this study captured the simultaneous impact of the relevant predictors, one of which was aviation policy, on air passenger traffic flows. In Africa, the national aviation policies vary, reflecting the balance between objectives and strengths of different constraints. In addition, the sophistication of the aviation policies adopted and the ability to implement them effectively differ across African countries.

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Commercial challenges faced by low cost carriers in the contemporary aviation landscape

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Abstract: The continued success of the low-cost business model (LCC) of Southwest Airlines had induced the emergence of numerous low-cost businesses across the globe during the last two decades, such as Canadian WestJet, European Ryanair, Middle Eastern Air Arabia & flydubai, Malaysian Air Asia, and Australian Virgin Blue. The competitive landscape of LCC businesses is challenged by two factors, (i) the increasing number of low-cost competitors, and (ii) full service network carriers (FSNC) with wide-bodied aircraft, matching LCC's price range in their unoccupied portion of the economy class compartment. LCCs are, therefore, forced to compete with these dual forces. The fierce competition is pushing LCCs to develop new survival strategies, predominantly the 'hybrid model' which takes cost advantages from the LCC model and service features from the FSNC model. This paper analyses and discusses the business and operational challenges confronting the hybrid model, with recommendations in the concluding part of the paper.

Keywords: Low Cost Carriers (LCC), full service network carriers, hybrid model.

1. Introduction and background

Authors' backgrounds

The first-named author is employed with a low-cost carrier in the operational area from the start-up phase, and has previous experience with an established full service carrier. The co-author was employed by three reputed international full service carriers in the last three decades. Furthermore, the co-author has implemented interline e-Ticketing projects (IET) with more than 100 airlines (2005-2010), including with ticketless low-cost carriers such as Virgin Blue (2008) and flydubai (2010), the first LCC IET in the Middle East. Interlining (IET), i.e., the carriage performed on the services of more than one carrier, is one of the core components of the hybrid model.

Overview of the LCC business model

Southwest airline is the oldest and largest LCC, established in 1971 with a fleet of 550 Boeing 737 aircraft operating among 73 cities, and more than 3200 flights a day with around 37,000 employees (Southwest Airline Fact Sheet; Southwest.com, 2012). According to the authors' observation, the main contributors to the high level of success that Southwest enjoys includes the high demand for competitive fares, remote short haul destinations for which FSNCs did not cater, a loyal expert workforce and fuel-hedging practices.

Though the strategy of fuel hedging, Southwest were able to maintain low fares in comparison to their competitors in an environment of surging fuel costs. According to Michael Porter (2005, Strategy, p.68) Southwest airline's competitive advantage comes from the way its activities fit and reinforce one another. The primary and secondary activities of Southwest are illustrated in the Figure 1.

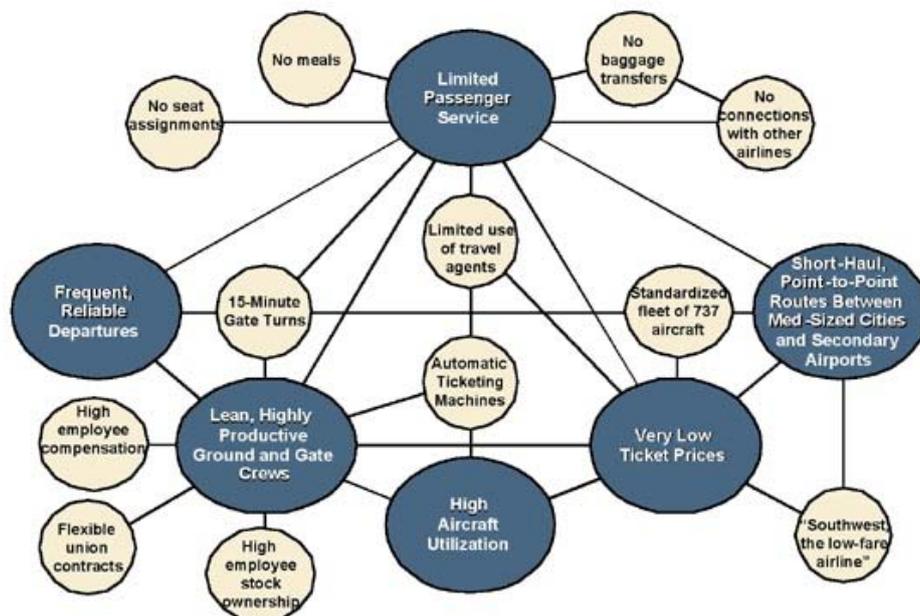


Figure 1. Southwest Airlines' activity system (Source: Porter, HBR, 2005)

Growth of LCCs in volume (numbers) and global span

The expansion of the low cost model to European, Asian and the Middle East markets was inevitable with its growing success in the United States. Figure 2 illustrates the global spread of LCC's in 2000 and subsequently the last 12 years have seen even further growth in both volume and global span.

Carriers such as Ryanair, easyJet and airberline were further benefited with the EU implementation of the Single European Sky (SES) in Regulations 549-552/2004 (Holloway, 2008, p.247). This facilitated flexibility for intra-European air transport.

Air Asia (with a new organizational structure) in Malaysia and Virgin Blue Australasia were the first major LCCs to be established in the early 2000s, followed by Air Arabia (2003), Al Jazeera (2004) and flydubai (2009) in the Middle East.

The LCCs are estimated to grow four times as large by 2029, as *per* a Boeing study (2011) illustrated in the Figure 3, whilst FSNC are expected grow only double in the same period.

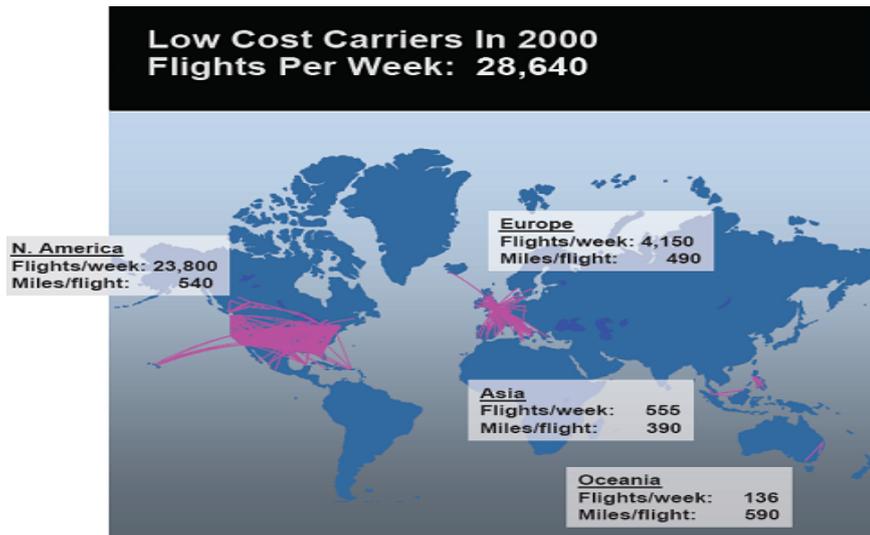


Figure 2. Low Cost Carriers in 2000 (Source: Boeing – Air Travel Consumer Report, 2003)



Low cost carriers growing twice as fast

- Boeing expects the low cost airlines industry to be 4 times as large within 2029
- Full service carriers will only double in the same period

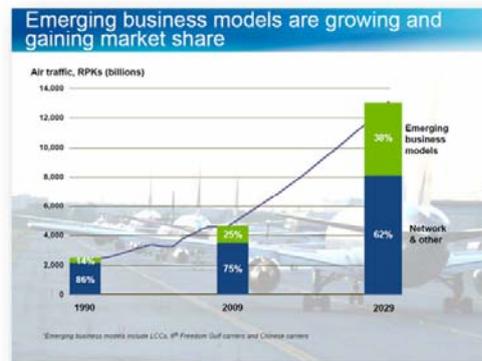


Figure 3. LCC are growing twice as fast as FSNC (Source: tmcomponent.Travelmarket, 2011)

2. Research methodology: approach and limitations

Given the combined ‘on-the-job experience’ of the authors with LCCs and FSNCs exceeding four decades, the primary source of qualitative research for this paper has been “*observation or participant observation*”. According to Shajahan (2009, p.45) “the purpose and aim of observation is to discover significant mutual relations between spontaneously occurring events and thereby pinpoint crucial facts of information.” According to White (1999, p.35) “*participant observation* refers to a technique where the researcher becomes completely involved in the situation which is being researched.” The other primary sources are personal interviews and by

email and telephone with senior executives of LCCs and FSNCs in the Middle East, India and Asia Pacific during 2012.

The secondary sources are extensive publications related to the emergence of LCC models from their inception till today. Michael Porter, Emeritus Professor at Harvard Business School and Stephen Shaw, the veteran industry coach and author, have been the pioneering academic authorities on LCC models. The other publications on LCCs mostly reflect the same fundamental concepts of these pioneering academics, in varying terminology.

The limitation of this research has been the lack of a quantitative survey. The hybrid model is a new and emerging concept, with limited expertise in the industry to conduct a quantitative survey.

3. Analyses and discussions on LCC issues based on primary and secondary sources

Our research findings indicate the ‘Hybrid Model’ as a major survival tactic for long-term sustainability of LCCs. “Of the current issues that it is having to address, the debate over ‘True Low Cost’ compared with hybrid strategies is a particularly interesting one where the jury remains out to the best route to pursue” (Shaw, 2011).

Primary sources – qualitative analyses

Q1) *What are the challenges that you foresee that LCCs will be facing in the near future from the other LCCs and from full service network carriers?*

Survey Results

- i) Major challenge comes from other LCCs adopting hybrid model (GDS, FFP, etc.). FSNCs are not seen as a threat because they are poorly run with political interventions. Next decade will see LCCs emerging in hybrid models of varying features.
- ii) LCCs will face cash flow problems against rising costs of fuel and operating costs.
- iii) Biggest challenges to LCCs are the LCCs with better cost structure. LCCs with good cash and cost management will succeed. FSNC are not seen as a threat due to their legacy costs and poor margins will not allow them to drop prices further.

Q2) *With huge orders from full service network carriers for the Airbus 380, it is likely that the full service carriers can afford to drop the prices in their rear compartment to match the prices of the LCCs on the parallel routes. Do you see this as a threat to the LCCs?*

Survey Results

- i) A380 operating costs are high with low profit margins. Therefore they are unlikely to drop the prices. Only a small number of carriers may do so for short term benefits. No threat is seen.
- ii) A380 operate on long-haul sectors and LCCs on short-haul. Therefore they are not on the same platform to be seen as a threat to LCCs, plus high costs prevent price drop.
- iii) Unlikely, due to their long sectors when compared to LCCs mostly less than four-hour sectors; but if they do, then the only option for LCCs is to choose other routes.

Q3) *Do you see a value in LCCs going for multiple hubs? If yes, what value does this add?*

Survey Results

- i) Multiple hubs facilitate ‘expansion potential’, only if that is the carrier’s strategy.
- ii) LCCs lose focus when spread across multi-hubs. There is more risk than value.
- iii) This is not suitable for LCCs for many reasons, “geo-political” being one of them.

4. Hybrid model – discussion on pricing and operational issues (and options)

Primary Airports: under the hybrid model, LCCs are flying to primary airports (not just secondary airports) and competing with FSNCs on parallel routes. This hikes up the airport and route operational costs, which need to be built into the pricing structure and tickets.

Airport Lounges: can be built into i) price of higher booking class inventory (or cabin class) and ii) offered as an ancillary-priced product for lower booking class inventory.

Interline Reservation and Booking Processes: this has to be bilaterally agreed upon with interline partners; ideally the LCC should share the partner’s host reservation system to save costs from third party vendors.

Interline ticketing: being a ticketless product, LCCs can only interline at the receiving end of the feeder traffic from FSNC by accepting their ticket products.

Interlining baggage: the logistics need to be planned with interline partners, especially inter-terminal transfers (e.g., Emirates and flydubai operating to T3 and T2, respectively).

Interlining – delay of inbound flight: handling delays and disruption of connectivity is going to cost heavily on LCCs as they cannot pass this on to passengers.

Interlining – acceptance and utilization of tickets, accounting and billing process: even if DCS (Departure Control Systems) are modified to accept ticketed products, the back end sorting and billing process needs manual intervention (and additional costs).

Distribution via intermediate channels/GDS (Global Distribution Systems): this is a very challenging process for LCCs and needs meticulous planning and cost-benefit analysis. Being non-IATA members, LCCs need to circumvent IATA BSP machinery to enter the markets distributed by GDSs. Some LCCs use franchising (with IATA carriers) to circumvent IATA BSP, but that also costs a franchising fee.

Freight Product: lastly, there is an opportunity for LCCs to tap the freight product, by using underutilized cargo hold (if applicable). LCCs should take care not to increase freight handling costs else the purpose is defeated (if costs exceed revenue).

5. Conclusion and Recommendations

Our findings from the research indicate that LCCs are facing greater competition from the rising number of other LCCs, and *less* from FSNCs lowering the prices (this is at variance with the original hypothesis shown in the abstract).

The “Hybrid” mid-way solution is seen as an optimal way forward, but has many business and operational issues that need to be dealt with whilst maintaining the profit drivers of cost leadership model in the right direction. Stephen Shaw, industry expert and author (2011, p. 97), argues that “a cost leader firm has a set of clear requirements it must satisfy if it is to be successful. Firstly, it must achieve and then sustain significantly lower operating costs than its rivals. If it loses its cost advantage, it will be in serious difficulties.” Therefore, the hybrid

model needs a creative craftsmanship that draws synergies effectively from both models (LCCs and FSNCs), while continuing to maintain its cost advantage.

Looking at the various aspects and multitude of challenges, a well-balanced, well-cost-contained, well-connected and well-distributed hybrid LCC model seems to be the best way forward for long-term sustainability.

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