

“A review of literature on airline benchmarking – work in progress”

by

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Introduction

The concept of benchmarking is known to be a much discussed topic both in scientific and business matters. Comparing approaches, activities, outcomes and perspectives can provide vital information to influence the decision of organisations in their continuous challenge for profit and survival as an organization. The aim of this paper is to explore the scientific literature available on benchmarking of airlines.

Airlines continue to be in the focus of scientific research as they attract significant public interest and prove to be subject to many changes over time, although the general activity of transporting goods and people from one place to another never really changed.

The structure of the paper includes an initial consideration of the relevant changes to the global market for airlines, an exploration of the challenges airlines face followed by considerations on efficiency measurement and benchmarking in general. These findings are then used to generate an analytical framework to assess the sampled literature.

The intended outcome is to provide the necessary information to compare scientific publications for their usefulness. “Useful” publications are expected to provide either practicable solutions for managerial problems, insight into the sector as a whole or insight into the effects on the society as a whole.

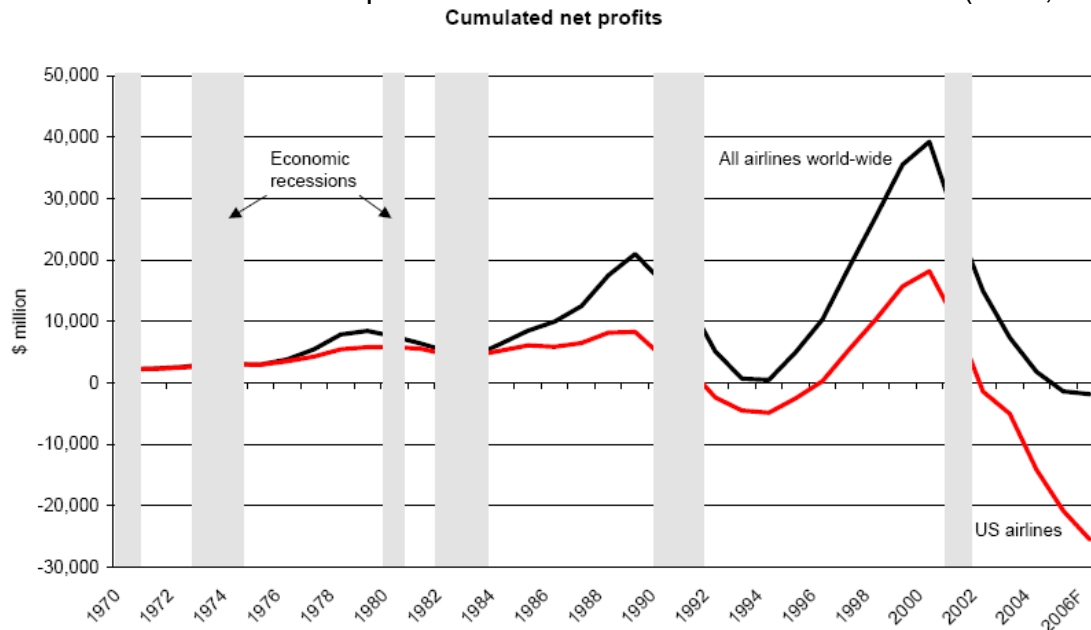
As this paper presents the current progress of the work on a final thesis, there are several limitations to the paper in terms of depth, sample size and importance of results. Any proposals for improvement or research are welcome to the author.

Overview of the development of the airline sector since 1970

Since the 1970s, Airlines face an increasingly volatile environment. Picture 1 shows the strong changes in the overall airline profitabilities since 1970. The blank areas are indicating economic recessions or special political events such as the first Gulf war 1990 to 1992 and the aftermath of the terror attacks in 2001/02.

The picture points at the divergence between the US airline sector and the global sector, too.

Picture 1: Cumulated net profits of airlines worldwide and in the US (IATA, 2007)



Several general influences can be identified for the airline sector.

First, there are general economic crises that hit the volatile aviation industry harder than other sectors. There is general consensus on an above proportional relationship between the world GDP growth and the growth of the world demand for air travel. Oum estimates this value to be about 2 (hence 2% growth of aviation growth for every 1 % of world GDP growth). Oum and Yu identify a regular 10 year rhythm of boom and bust that is characteristic for the airline economy (Oum and Yu, 1998). The growing magnitude of changes in overall profitability displayed in picture 1 hints at an increase of sector volatility of the airline business over time.

Second, major political events can influence airlines in two ways. The example of the gulf war and crisis from 1990 to 1992 shows a direct impact on crucial inputs, especially oil and the willingness to travel of passengers from perceived security risks. Indirect impact refers to the changes in the global economy resulting from global or regional geo-strategic insecurity.

Third, technology influences aviation directly through its impact on operational cost, security and productivity. Examples for this can be seen in the annual reports of regional airline associations such as the Air Transport Association (ATA) or global associations such as the IATA. Indirect influences originate from adjacent technology adjacent to the delivery of air line travel, such as distribution, baggage services, etc.

This factor includes both technologies such as airplanes as well as complementary technology such as air navigation systems or airports.

Fourth, legislation influences the aviation market both on a national and a global level. It affects the operations possible, the conditions to carry these out and the way market processes can take place. International mergers across borders for instance, are still subject to significant international legislative constraints, even in the recent open skies agreement between the European Union and the United States (BMVBS, 2007). The legislative heritage of a vast number of bilateral air service agreements was effectively forming the international aviation market since the 1950s (Good, Roeller and Sickles, 1995) is in major parts still effective.

Fifth, airlines are subject to competition from other airlines within the framework of macro-economic, political, technological and legislative conditions. With ongoing globalization (the continuous growth of international economic connections creating one global economic environment) and a continuous decrease of government intervention in the course of liberalization

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(USA, EU, AUS, NZ), this factor becomes increasingly important. The rise of “no frills” carriers such as South West Airlines (as so-called “blue-print”), Ryan Air, Gol and Air Asia to name but a few of highly successful Low-Cost Carriers shows the increasing importance of this factor. New competition on the supply-side influences demand patterns over time. Changes of demand patterns may also arise from general changes in the economic environment.

All five influences developed significant impact since the 1970s. Table 1 summarizes the most important events since 1970s, ordered by time and the kind of the influence. Prior to this, the most important aspects were the implementation of the new jet technology in the 1960s and the Chicago convention of 1944. The table is not intended to show all events, but those that had or have a significant impact on the airline business as a whole. In general, a “vulnerability of the industry to external shocks (...) out of the ordinary” (Gudmundsson and Oum, 2004) can be considered a fact.

Table 1: Chronological Overview of the Most Important Influences on the Airline Sector. Sources are various from the literature list

Time	General Economic Trends	Major Political Events	Technology	Legislation	Competition
1969					South West Airlines commences operations (profitable from 1974 on)
1970s	Decline of real yields begins (no end in sight yet)				Rise of Charter airlines
1973	First Oil shock				
1977	Global economic recovery				
1978				Full deregulation in the US domestic market	
1980s				Rise of Computer Based reservation systems	Frequent Flier Programs, Revenue Management, Emergence of Hub and Spoke as business model
1980	Second Oil Shock				First loss of

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					airline sector in total
1984				Beginning deregulation in Canada	
1986				Deregulation in New Zealand; European court ruling ends exclusion of aviation from common market policy	Emergence of first alliance between two airlines
1987 to 1992				Deregulation of the EU in three “packages” into a single market for the EC	
1990		Rise of the internet		Deregulation in Australia	LCCs develop significant size
1990 to 1992	First gulf war				
1995					
2000	Burst of “internet bubble”, decline of global stock markets				
2001		9/11			
2004	SARS- Crisis				

The determinants explained and their impacts draw the picture of a volatile but in terms of size strongly growing world market. Boeing expects an increase in the global fleet of planes of approx. 18,000 planes by 2025, resulting in more than double the fleet than 2005 (Boeing, 2005).

Picture 2 shows the development of the US airline market from 1995 to 2005.

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Picture 2: Traffic figures from ATA members, aggregated for the years 1995 to 2005, (ATA, 2005)

Eleven-Year Summary										
U.S. Airlines (In millions, except as noted)										
	1995	1996	1997	1998	1999	2000	2001 ³	2002 ³	2003 ⁴	2004
Traffic and Operations¹										
Revenue Passengers Enplaned	547.8	581.2	594.7	612.9	636.0	666.2	622.1	612.9	646.3	702.9
Revenue Passenger Miles (RPMs)	540,656	578,663	603,419	618,087	652,047	692,757	651,700	641,102	656,909	733,680
Available Seat Miles (ASMs)	807,078	835,071	857,232	874,089	918,419	956,950	930,511	892,554	893,824	971,466
Passenger Load Factor (%)	67.0	69.3	70.4	70.7	71.0	72.4	70.0	71.8	73.5	75.5
Average On-Flight Trip Length (Miles)	987	996	1,015	1,008	1,025	1,040	1,048	1,046	1,016	1,044
Cargo Revenue Ton Miles (RTMs)	16,921	17,754	20,513	20,496	21,613	23,888	22,003	24,591	26,735	27,978
Freight and Express	14,578	15,301	17,959	18,131	19,317	21,443	20,119	23,243	25,363	26,682
Mail	2,343	2,454	2,555	2,365	2,296	2,445	1,885	1,348	1,372	1,296
Revenue Aircraft Miles (RAMs)	5,293	5,501	5,659	5,838	6,168	6,574	6,514	6,556	7,070	7,647
Aircraft Departures (Thousands)	8,062	8,230	8,127	8,292	8,627	9,035	8,788	9,187	10,839	11,401
Average Stage Length (Miles)	657	668	696	704	715	728	741	714	652	671

Most noticeable for the results of the ATA members is the strong growth in traffic volume (passenger enplanements, revenue passenger miles, etc.). Given the problems with profitability shown in picture 1, the contrast between a struggling profitability and strong, continued growth shows that the airline sector is in a mixed situation:

Continuous growth of the market accompanied by a very low historical profitability, despite or because of the cyclic nature of the business.

Market growth differs throughout the regions. As to the constraints of this work, only the general trends of market growth are outlined.

The differences in the market structure between the years 2004 and 2005 are illustrated by pictures 3 and 4. The average growth displayed in picture 3 in passengers carried is significant at a global level with 7.1% but Asia and especially Africa and the Middle East outgrow Europe and North America, the areas with the two largest accumulated economies worldwide. The same pattern can be seen in the official forecast of the ICAO for the years 2005 to 2007 as displayed in picture 4. Growth is overall strong, but North America as the most mature market with the longest history since its effective deregulation shows the smallest changes.

The author believes that the continued catching-up of the Asian aviation is closely connected to the recent period of lasting economic growth.

Picture 3: Table 2. Growth of traffic by region, 2004-05 percentage change (ICAO, 2006)

Region of registration	Passengers carried	Passenger-kilometres	Freight tonne-km	Mail tonne-km	Total tonne-km
INTERNATIONAL AND DOMESTIC					
Africa	11.6	12.1	6.1	18.8	11.7
Asia and Pacific	6.3	7.2	3.9	7.8	6.0
Europe	8.5	9.0	2.5	0.8	7.0
Middle East	7.7	13.6	12.4	-0.4	13.1
L.America/Caribbean	5.6	6.4	-2.7	10.0	4.1
North America	6.5	7.0	-0.6	-2.6	5.0
Worldwide	7.1	8.0	2.5	1.9	6.3
INTERNATIONAL					
Africa	8.7	11.4	6.3	28.9	10.9
Asia and Pacific	6.3	6.1	3.4	6.1	4.9
Europe	9.8	10.1	2.6	3.9	7.5
Middle East	6.0	14.0	12.3	-0.6	13.3
L.America/Caribbean	4.4	6.7	-3.8	11.1	3.5
North America	12.0	9.8	-0.1	4.6	5.8
Worldwide	8.8	9.0	2.9	5.1	6.7

Picture 4: Forecasted scheduled traffic growth
ICAO scheduled passenger traffic forecasts – 2005-2007

passenger-kilometres performed (PKPs)

Region of Airline Registration			Average Annual Growth (%) 1994-2004	FORECAST					
	1994 (billions)	2004 (billions)		2005 (billions)	2005 Growth (%)	2006 (billions)	2006 Growth (%)	2007 (billions)	2007 Growth (%)
<i>Africa</i>	47.2	75.2	4.8	80.1	6.5	85.4	6.6	90.1	5.5
<i>Asia/Pacific</i>	493.0	903.7	6.2	986.8	9.2	1 069.7	8.4	1 158.5	8.3
<i>Europe</i>	525.2	919.9	5.8	989.8	7.6	1 055.1	6.6	1 123.7	6.5
<i>Middle East</i>	62.0	148.3	9.1	165.8	11.8	185.7	12.0	202.0	8.8
<i>North America</i>	867.2	1 247.3	3.7	1 325.9	6.3	1 385.5	4.5	1 443.7	4.2
<i>Latin America/ Caribbean</i>	105.8	147.3	3.4	156.4	6.2	165.0	5.5	174.3	5.6
<i>World</i>	2 100.4	3 441.7	5.1	3 704.9	7.6	3 946.5	6.5	4 192.4	6.2

The intent of this section is to provide a short overview of the global airline market since the 1970s. Its main features are a continued and increasing volatility with an underlying strong growth trend, heterogeneous profitability amongst the supply side and a very low profitability overall over time (despite successful examples like Southwest, Singapore Airlines, Emirates, Lufthansa, etc.).

With GDP growth a major growth driver, the regional differences in economic growth, e.g. between Europe and Asia (especially India or China to name extreme examples), continue into the regional distribution of growth.

The major challenges for aviation companies originate only in parts from manageable areas, such as innovation of competitors, new technology or innovative business models but also from events beyond managerial control with potentially very significant impact (force majeure, terrorism, etc.).

The following sections will point towards identifying the most important challenges airlines need to understand and adapt to.

Challenges to airline business

Airlines are, as explained before, subject to strong fluctuations in their market that occur in significant and unpredictable frequency as well as magnitude. The underlying reason is that the

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nature of the business remains both cyclical and volatile as recent press reports show, e.g. at www.atwonline.com.

First and foremost, airlines produce a service, hence a good that perishes completely and instantaneously if not used and that needs to match the timing and space of the customer in need for the good (a good example for this would be a flight a day too late or into the wrong city). Already the definition of operational indicators for the good “air travel” is difficult enough. The benchmarking study of TRL identifies a total nine different indicators depicting the output of an airline:

- Work Load Units / WLU(100kg of Cargo or one passenger)
 - Number of revenue flights
 - Revenue-Tonne-Kilometres / RTK (the amount of miles flown with paid for load)
 - Available Tonne-Kilometres ATK (as above but referring to the actual amount of km flown)
 - Revenue-Passenger-Kilometres / RPK(total of distance of transportation of all passengers in one period)
 - Available-Seat-Kilometres / APK (analogue to ATK but for passenger seats)
 - Total number of passengers flown
 - Total hours flown
- (TRL, 2006)

In contrast to e.g. a bakery store, it is not easy to identify which airline produced more or more efficiently than another airline. The underlying reason is that airlines generally use a network of connections between airports to deliver their service to the customer. They do so intentionally when they follow a “hub and spoke”-system, where flights from smaller airports lead passengers along “spokes” (as in the spokes of a wheel) into a “hub” where the incoming traffic is assembled to be redistributed according to the intended destination.

This occurs also unintentionally when airlines operate a point-to-point network connecting city pairs only regardless of down-stream redistribution of traffic as to create profitable transport business between two airports and their catchment areas. With an increasing number of flights, differing importance of destinations (Hahn vs. Stansted) and constraints in infrastructure, point-to-point connections create a network.

Although an airline customer basically buys the movement of himself and his luggage, he is also taking advantage of explicit and implicit services connected to the mere act of transportation. Explicit services include the use of websites and travel agents for booking, transport to and from the airports, various kinds of paid and unpaid in-flight services (entertainment, catering,). Implicitly an airline needs to provide a safe, reliable and competitive service.

Safety is paramount as any airline posing a significant risk to its passengers of losing life or limb should not expect to find many customers and can be considered a given in the reviewed sample as air travel remains a very safe way of transportation in terms of statistics.

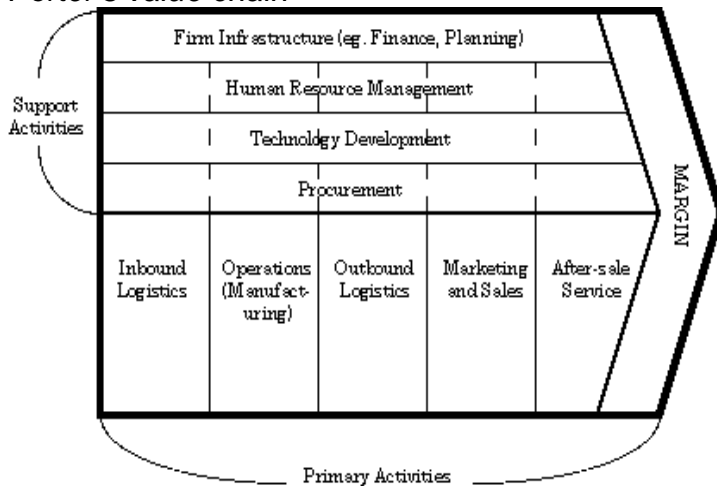
Reliability of a service is a much more complex issue. Initially, an airline needs to manage its own processes in time (and ideally every time). Hereafter, there are many factors beyond an airline’s control. This refers to infrastructure constraints, force majeure events (accidents on a runway, safety issues, congestions, weather) as well as up- and downstream services.

From a customer’s point of view, air travel commences with the booking of the ticket and ends with returning home.

For reasons of clarification, the value chain approach of Porter is applied upon air travel from the author’s perspective, as displayed in picture 5.

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Picture 5 Porter's value chain (Porter, 1985) and an application on air travel by the author
Porter's value chain



Author's Application to air travel

Fleet financing, covering fixed costs in downturns					Margin
Service-orientation of staff, keeping staff motivated					
Flying ability (conditions, speed, capacity), In-flight entertainment, comfort of service					
Fuel, catering, general material					
Ticketing & payment; Computer Reservation System/online sales	Optimized schedules	Delivery of baggage	Brand building	Complaint Management	
Baggage pick-up	Flying timely, safely, reliably	Immigration	Market intelligence (service level, destinations, ...)	Tailored solutions for business customers	
Collecting passengers	Airport experience while waiting	Connection to new flight (at hubs	Frequent Flyer Programme		
Ground handling	Providing information potential deviations on time		Yield Management		

The application to air travel in picture is a mere selection of activities. Many more activities could be named to complete the picture of an airline and its operations. The objective is to show that an airline has to do a lot more than flying a couple of persons from place A to B. The task is to plan, establish, manage (profitably) and maintain a network of connections with potentially very long connections. It is not denied that there are airlines that serve in very small nice markets (e.g. in the North-West of Germany for the islands in the Northern Sea) but the focus of this task lies on larger airlines that operate at least on a nationally significant scale.

Up to here, two aspects could be clarified: It is not very easy to identify the output for all airlines in one single measure without losing measurement accuracy. Also, airline business is not only about flying it is about managing a network of connections. These connections are subject to a wide array of influences. Some of these influences would be amongst others:

- A need for flexible actions with a high fixed cost share in the production process from expensive plans
- Dependency from specialist staff such as pilots or traffic controllers who despite their small numbers can have significant impact on operations
- Volatile and cyclical business with increasing competition
- A sector with an exceptionally low historical profitability
- A multitude of factors beyond the control of management, such as
 - Oil price
 - Security aspects
 - Increasing importance of ecological aspects
 - Infrastructure constraints
 - Increasing price pressure from competition

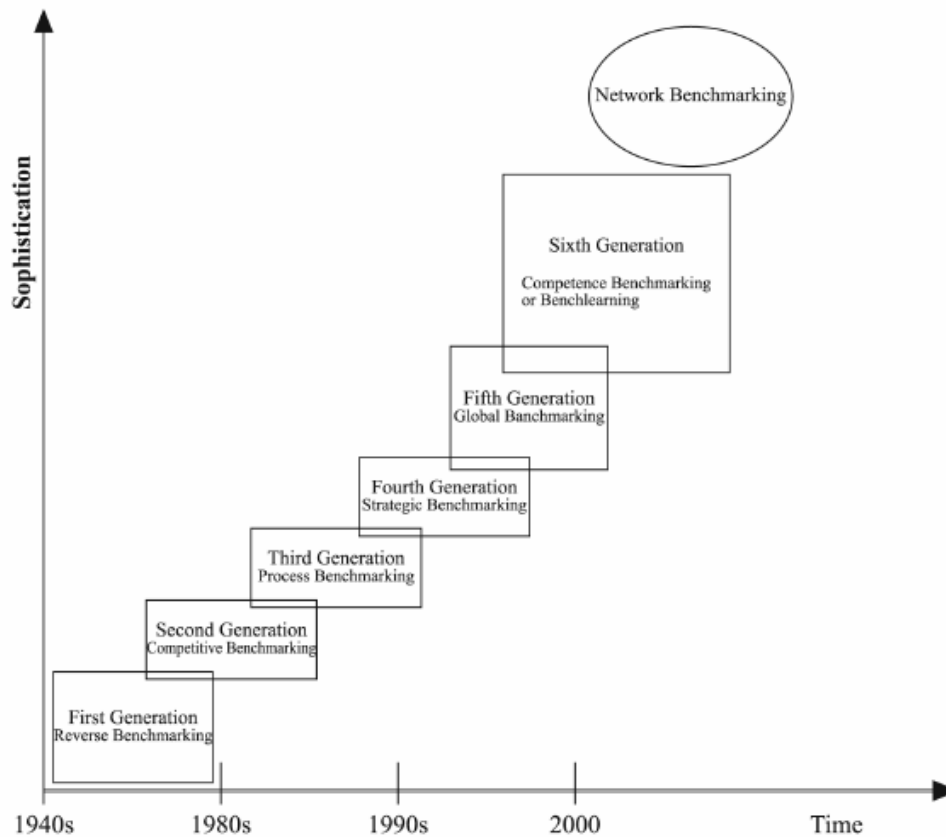
The challenges for the aviation industry originate from many sources. They are creating the need to understand the business, the factors influencing it and the conduct of competitors.

Efficiency Measurement for airlines

This section is to give an overview of the methods that can be applied to measure the performance of an airline. After an introduction to the development of the benchmarking method in general according to the understanding of Kyrö, the text will commence with a brief depiction of the general range of methodologies that science offers. This range will then be analyzed for its applicability on management.

In her work from 2003, Paula Kyrö tries to identify how new scientific achievements changed the concept of Benchmarking. Initially, seven steps of development are identified: Reverse Engineering, mostly associated with the famous project of Xerox to understand the cost advantages of their Japanese competitors in the 1980s, competitive benchmarking, process benchmarking, strategic benchmarking, global benchmarking, benchlearning and finally network benchmarking (See also graph below). These steps are to characterise consecutive steps of the development of benchmarking as a managerial method as illustrated in picture 6 below.

Picture 6: The stages of the development of benchmarking (Kyrö, 2003)



Source: Modified from Ahmed and Rafiq (1998, p. 288)

Source: Kyrö, 2003

The main difference between the different stages is the need to learn from competitors to gain or maintain competitive advantage which causes an increasing willingness to share information. According to the findings of the survey of Francis et al, airlines are using benchmarking extensively and develop a growing tendency to share information. This includes information that was considered vital and therefore confidential. As reason for this, airline managers name that single technological or organizational processes are not vital to their business model but that sharing information can generate much needed efficiency increases (Francis et al, 2005). Hence the need to adjust benchmarking approaches originates from challenges in the business environment.

To categorize the different benchmarking methods, three factors are identified by Kyrö: The Benchmarking partner, the target and the partner in the benchmarking process providing the comparison. For those three factors, different characteristics of these factors are identified as shown in the table below.

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Table 2: The dimensions of the three factors influencing benchmarking categories

<i>Who = a benchmarker</i>						
1. Structure	Unit		Organisation	Network		
2. Geographical scope ^a	Local	Regional	National	International	Larger alliance	Global
<i>What</i>						
3. Target ^a	Performance		Technology	Process	Competence	Strategic
<i>With/against whom = a partner</i>						
4. Structure	Unit		Organisation	Network		
5. Nature	Internal		Competitor	Same industry sector or cluster	Generic	
6. Geographical scope ^a	Local	Regional	National	International	Larger alliance	Global
Note: ^a Scaling of relevance: 1 = non relevant; 2 = low; 3 = medium, 4 = high						

Source: Kyrö, 2005

The results of Kyrö show that the concept of benchmarking evolved from a mere reproduction of competitors' products (reverse engineering) to the intentional sharing of information on vital processes across sectors and regions. This is shown by the various characteristics of the factors and the change of the concept over time.

It should be noted that the scope of this work is to review the available literature on airline benchmarking and not to develop a new framework of benchmarking categories. In this framework, airlines are the benchmarker (or their organisations/business partners), the target is basically any process in the value chain (compare picture 5) and the geographical is variable (although a tendency to share information with partners relevant for the own market is likely).

It is possible to conclude from the framework of Kyrö and the findings of Francis et al to conclude that the airline sector evolved towards the phase of benchlearning. This would be consistent with the timeframe of both publications and with the extensive willingness to share information amongst airlines.

A key aspect for differentiating performance is the question of aggregation. The work of TRL in the annual publication "Airline Performance Indicator Report" provides several dozens of tables with indicators for the sampled airlines (Jacobs Consultancy Airport Management Consulting). The indicators are computed from publicly accessible information, mostly annual reports, and provide ratios of outputs, inputs and cost components as well as balance sheet information. These indicators then provide insight into one aspect of the operations of an airline, e.g. the amount of revenue generated per passenger or per employee.

Several aspects need to be considered when using these partial productivity indicators. First, they reflect only a fraction of the complex operations of an airline. This creates good comparability but does not allow a comprehensive understanding from the analysis of one indicator alone. Second, partial indicators allow quantifying performance gaps and hence defining managerial objectives. Third, the good measurability in detail does not substitute the need for a thorough understanding of the organisation under review.

A more aggregated approach is used by total factor productivity approaches such as Data Envelopment Analysis, Stochastic Frontier Analysis and other more complicated approaches. Basically, this method tries to identify the most efficient production function possible for a given sample and then to measure the extent to which this is achieved by individual organisations based upon highly aggregated measures. The advantages of this method are as numerous as its drawbacks, like with a partial performance measurement approach.

In contrast to a partial measurement, a review of organisations as a whole allows to compare performance in their totality. Also, especially Data Envelope Analysis is not constrained by units as it is expressed in ratios, which solves some measurability issues.

The drawbacks are numerous, too. First, the measurement of inputs and outputs is not always straight forward. Frequently, inputs and outputs are measured by indexes based upon indicators such as miles flown, estimates of capital employed, etc. This constraint in information may pose a challenge to the quality of the sample respectively the data underlying the analysis. Second, even with perfect information, a comparison of efficiency and productivity is well possible, but makes the generation of manageable targets more difficult. Third, comparison of companies founding on their overall efficiency implies the actual production function of a superiorly efficient company is known as measure of comparison. As this is very difficult, the quality of this approach hinges on the assumed production function sampled organisations are compared with.

An alternative approach of differentiating different levels of aggregation is divide measurement into that of performance factors (PF) and that of performance indicators (PI).

PF are those factors that can be changed by management, causing either individually or combined with others a direct or indirect change in the organisation or parts of it (Gudmundsson, 2004).

PI in turn are those factors that are changed by altered PF, be it directly or indirectly.

Whilst PF are at the micro-level by definition, otherwise they would not be directly manageable; PI can refer to macro- and micro-perspectives. The higher a PI aggregates, the more difficult is the identification of the relevant PF to change the PI in the desired direction. Additionally, the change of one PI may create unintended side effects due to the complexity of airline business.

Gudmundsson provides where the flight frequency is lowered to increase the load factor from a market with constant demand. Albeit the constant demand fills the less offered connections with a higher load factor, the declined frequency will negatively influence the utilisation of the airplanes employed as they fly less (Gudmundsson, 2004).

This approach clarifies the dilemma performance measurement creates. Perfect measurement of all activities provides microscopic insight and creates manageable problems as gaps can be identified. The very same focus automatically impedes an understanding of the organisation as a whole from these partial indicators.

As the purpose of this paper is to review the results of literature in airline benchmarking, the author points out that there are many additional methodological aspects to be considered but that this would go beyond the limitations of this work.

The most important aspects to consider about performance measurement are that partial indicators are more detailed and manageable but do not give away an impression of the organisation as a whole. Whilst total factor productivity can generate comparisons between companies as a whole, it cannot point at the actual causes for differences in efficiency/productivity. Given these two aspects, the advantages and disadvantages of the two methods appear complementary. There are extensive attempts in the scientific literature to mediate between these diverging approaches or to make the case for one of the two. It remains to the judgement of the reader if there is a superior approach and if so, which one it would be. The following depiction of the concept of benchmarking will provide some insight into the concept.

When it comes to the application of benchmarking, various aspects are to consider. The term of “benchmarking” is defined very often and at times very differently, which represent different stages of the development of the concept (as indicated above).

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Generally speaking, the theoretical construct of benchmarking refers to the comparison of organisation based upon the measurement of their activities and the degree to which they achieve a given set of targets. Ahmed and Rafiq refer to the “essence of benchmarking” as “learning how to improve business activity, processes and management” (Ahmed and Rafiq, 1998). This is a very general statement but points at the wide range of activities under the umbrella of the concept (Kyrö’s work does not imply that the development of the concept means that more classical approaches are not applicable or applied any more).

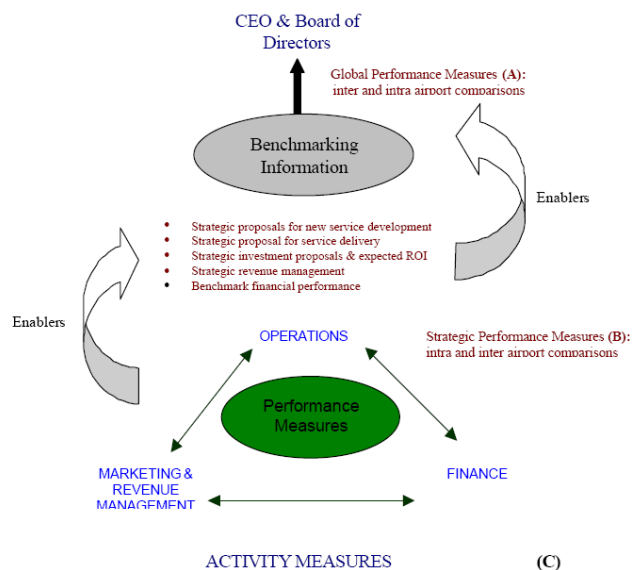
Cox and Wolfram identify two major topics in benchmarking literature: Learning from contexts beyond the own organisation and adapting a formalized learning process (Cox et al, 1997 in Ahmed and Rafiq, 1998). This is subject to the ability of the organization conducting the benchmarking process to conduct a successful benchmark both on the operational or project level and on the strategic or cultural level of its organization (Ramabadron et al, 1997). The first condition is necessary, the second sufficient for a successful identification, analysis and implementation of superior business practice.

There is a crucial difference between performance measurement and benchmarking as a managerial tool. Performance measurement provides information on the operations and their outcome, whereas benchmarking is aimed at a specific target, most likely the improvement of one or more aspects of a company. These aspects can be operational, strategic, specific for one department or detailed in some other way.

The linking of measurement, analysis and strategic decision is analyzed by various authors; here an example from the implementation of total quality management is taken. Picture 7 shows how the measurement of activities on level C is used to obtain information that is then condensed to a set of strategic options at level B. This is the basis for a strategic decision and monitoring, at the global level A.

Picture 7: Benchmarking and Performance Measurement (Gillen, unknown)

The Integrated Tiers of Benchmarking & Performance Measurement



These three levels illustrate the different perspectives applied to the process of measuring activity. While being a mere assessment of the current status of one organization and its peers,

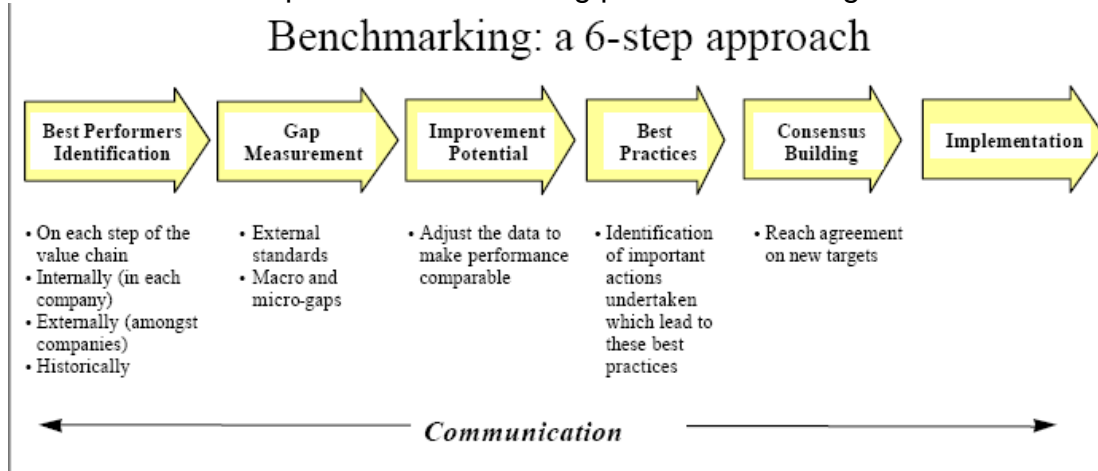
the performance measurement is the necessary condition to be fulfilled for achieving knowledge about strategic options and finally more successful decision making and monitoring (sufficient condition). The above mentioned approach to differentiate between performance factors and performance indicators would place all performance factors at level C and disperse the available performance indicators over the levels A to C. As indicated before, it would be possible to conclude from micro PI to their impact on macro PI but it is reasonable to expect the inverse approach to be much more difficult.

With the learning process in the main focus of the concept of benchmarking, the applicability of the tool to management of an organization depends almost completely on the availability and usefulness of data.

Independent from the kind of benchmarking applied as displayed in the work of Kyrö; the applicability of benchmarking results depends on how well the knowledge obtained can be transferred into understandable targets. Once the target and its aspects are known, it is possible to identify methods of implementation, monitoring indicators and ultimately the success of the change of operations.

One of many examples for the process of benchmarking is shown in picture 8 where the first 4 steps refer to measurement and comparison and the last two to the implementation. After the last step, the process can be reiterated to assess the success of the implementation and to continue the adaptive process to an ever changing business environment.

Picture 8: The 6 steps of a benchmarking process according to Gillen



Managerial application depends strongly on internal factors of the organizations such as a general consensus on the need to improve at all levels (especially senior management) and the ability to do so (time, budget, qualification).

The analysis of the benchmark needs to meet the following criteria to be effective:

For airline benchmarking to be successful from a managerial perspective, it has to overcome various challenges. These are the general problems any kind of benchmarking is bound to encounter. They are illustrated along the process chain provided by Gillen (see picture 8). The identification of performance both internally and externally implies that the organization conducting this research is aware of the relevant information, has access to it and that it can process it. For the first and the last step, sufficient resources allow obtaining this kind of

information, e.g. by hiring superior specialist expertise from a consultant. But some information is simply not available from other organizations; examples could be the request to Ryan Air to reveal their charges at various airports or the cost structure of individual airports from AENA. Neither of these two is willing to share such information. This needs not to be the case, for some aspects, there simply is no information (and it may be too costly to measure it and even if not, historical information for time comparisons would not be readily available).

The analysis of the collected information (steps 2) is often hinging on arbitrary standards. Step 3 is connected to this, as adjustments for comparability are usually unavoidably but add to the impact of individual judgement on the process.

Step 4 may create additional problems as not all practices of other organisations can be transferred by blue print from one organisation to another. Here, cultural aspects are of major importance and there is ample evidence throughout economic literature that what is good for one company may well be detrimental for another, if the aspects in question are transferable at all. Steps 5 and 6 are often subject to the complexities of organisations and their environment as it is not guaranteed that, once targets are identified, these are achievable at sensible cost and in a sensible time frame.

There are many additional sources of problems of diverse magnitude and complexity. But it is crucial to point out that for a benchmarking process; mere performance measurement is no more than the very first step. Thorough preparation, appropriate analysis and implementation of results are needed to make a benchmarking activity, be it project based or part of a continuous process, successful.

As indicated before, “useful” publications are expected to provide either practicable solutions for managerial problems, insight into the sector as a whole or insight into the effects on the society as a whole.

For literature on airline benchmarking, the following formal criteria can be derived to assess their usefulness for management:

1. Is the value chain/the part of it under review captured completely and correctly in terms of the interdependencies between the measured activities and the aspect under review?
2. Is the sample of data reliable (would it show the same results if tested again)?
3. Is the methodology applied correctly (e.g. clearing out statistical errors, comparison of like with like, etc.)?
4. Does the analysis provide a transferable solution? And if not, does it provide in lieu for this insight into general processes that affect the industry of the organisation?

These criteria will be applied to assess the publications under review in terms of how their approach and findings could be useful for a managing problem. Additionally, the literature will be categorized according to the depiction of the development of the airline market since the 1970s (see above) and the degree of aggregation of the results.

It could be shown that benchmarking is a complex and versatile concept that operates at different levels of aggregation, both in terms of the process as a whole as well as throughout the process.

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The review of literature will focus on the work of some scholars that have published several pieces of scientific literature in the relevant publications. All components of the sample are essays with online availability as this source provided quickest and broadest access to relevant publications.

Table 3 Selection of literature on performance measurement

Caves, Christensen, Tretheway; 1984	Economies of Density versus Economies of Scale: Why Trunk and Local Service Airline Costs Differ	Performance Comparison
Fehti, Jackson, Weyman-Jones; 2001	European Airlines: a Stochastic DEA study of efficiency with market liberalisation	Performance Comparison
Fehti, Jackson, Weyman-Jones; 2001	Measuring the Efficiency of European Airlines: An Application of DEA and Tobit Analysis ¹	Performance Comparison
Fehti; 1995	The Performance of European Airlines in an Era of Liberalisation, 1991-1995	Performance Comparison
Forsyth; 2001	Low-cost carriers in Australia: experiences and impacts	Performance Comparison
Forsyth; 2001	Total Factor Productivity in Australian Domestic Aviation	Performance Comparison
Good, Nadiri, Roeller, Sickles; 1993	Efficiency and Productivity Growth Comparisons of European and U.S. Air Carriers: A First Look at the Data	Performance comparison
Good, Roeller, Sickles; 1995	Airline efficiency differences between Europe and the US: Implications for the pace of EC integration and domestic Regulation	Performance comparison
Gudmundsson; 2004	Management emphasis and performance in the airline industry: an exploratory multilevel analysis	Performance comparison
Morrell, 1999	The Role of Capital Productivity in BA' s recovery so far	Performance Comparison
Morrell, 2005	Airlines within airlines: An analysis of US network airline responses to Low Cost Carriers	Performance Comparison
Oum and Yu; 1995	A productivity comparison of the world's major airlines	Performance comparison
Oum and Yu; 1998	Cost Competitiveness of Major Airlines: An International Comparison	Performance comparison
Oum, Fu and Yu; 2005	New evidences on airline efficiency and yields: a comparative analysis of major North	Performance comparison

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	American air carriers and its implications	
Scheraga; 2003	Operational efficiency versus financial mobility in the global airline industry: a data envelopment and Tobit analysis	Performance Comparison
Suzuki, 2000	The relationship between on-time performance and airline market share: a new approach	Performance comparison

There is a focus on more recent literature and it has been attempted to reflect major parts of important authors, especially of Tae Oum from Canada. An additional focus is on more recent literature as this appeared sensible as to provide a broader view on current topics.

The category “general topics” can involve the following criteria: General, Regulation, Alliances, Performance Comparison, Network, Market Development, Sustainability and Strategy.

“General” includes all sampled literature that either did not match any of the other criteria or referred to very broad topics.

“Regulation” is chosen for publications that consider aspects of regulations in terms of ex-post or ex-ante impact analysis for one more changes in the legislative environment of airlines.

“Alliances” includes those articles that analyze the impacts of cooperation between airlines, beginning with code-sharing (the simplest form of cooperation) and ending with strategic partnerships, e.g. indicated reciprocal investments of the partner companies into each other.

“Performance Comparison” refers to all literature that relates and compares the outcome of operations or more aggregated results, for instance regarding social welfare outcomes.

“Network” refers to all choices of airlines which airports are to be served during its course of business and which interconnections exist.

“Market Development” indicates considerations on the development of regional or global markets over time; be it past, present or future periods. Hence forecasting would be included in this sample as well.

“Sustainability” refers to literature on questions of the impact of the aviation sector on the environment and the society as a whole.

“Strategy” refers to literature considering the key competencies of airlines or long-term choices such as the reaction to significant changes in the business environment or those involving significant opportunity cost trade-offs.

It is obvious that these indicators do not catch the whole variety of issues airlines faces. However, they are deemed fit to categorize the sample in a consistent and sensible manner. Later stages of this research are planned to include a broader and more detailed systems of topical indicators. There is a vast amount of literature on the quite wide topic of airline benchmarking.

Also, as to the size restrictions of this work, the analysis of literature on performance measurement is going to be the next step of research, as table 3 shows a mere selection of the selection of the available sources. With the focus of preparing the ground for further analysis and the limitations to the extent of this research, it appeared more feasible to rather develop a broad framework than to provide initial but too narrow-focussed research on an issue of such complexity.

Table 3 Overview of the sampled literature

Review of literature on airline benchmarking – work in progress
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Authors and Year	Title	General Topic
Gudmundsson, Rhoades; 2001	Airline alliance survival analysis: typology, strategy and duration	Alliances
Oum and Park; 1997	Airline Alliances: current status, policy issues, and future directions	Alliances
Oum and Zhang; 2001	Key aspects of global strategic alliances and the impacts on the future of the Canadian airline industry	Alliances
Oum, Park, Kim; 2004	The effect of horizontal alliances on firm productivity and profitability: evidence from the global airline industry	Alliances
Vowles; 2000	The geographic effects of US airline alliances	Alliances
Francis, Humphreys, Fry; 2005	The nature and prevalence of the use of performance measurement techniques by airlines	General
Gudmundsson; 2002	Airline Distress Prediction Using Non-Financial Information	General
Suzuki, 2002	An empirical analysis of the optimal overbooking for US major airlines	General
Suzuki, Tyworth, Novack; 2001	Airline market share and customer service quality: a reference-dependent model	Market Development
Swan; 2002	Airline route developments: a review of history	Market Development
Swan; 2006	Misunderstandings about airline growth	Market Development
Vowles; 2000	The effect of low fare air carriers on airfares in the US	Market Development
Vowles; 2001	The “Southwest Effect” in multi-airport regions	Market Development
Vowles; 2006	Airfare pricing determinants in hub-to-hub markets	Market Development
Dennis; 1994	Airline hub operations in Europe	Network
Gudmundsson, Lechner; 2006	Multilateral airline alliances: Balancing constraints and opportunities	Network
Oum, Zhang and Zhang; 1995	Airline Network Rivalry	Network
Baltagi, Griffin and Rick; 1995	Airline Deregulation: The cost pieces of the puzzle	Regulation
Good, Roeller, Sickles; 1995	US Airline Deregulation: Implications for European Transport	Regulation

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Kahn, 1988	Surprises of Airline Deregulation	Regulation
Morrel, 1998	Air Transport Liberalization in Europe: The Progress So Far	Regulation
Francis, Dennis, Humphreys, Ison, 2007	The transferability of the low-cost model to long-haul airline operations	Strategy
Franke, 2004	Competition between network carriers and low cost carriers – retreat battle or breakthrough for a new level of efficiency	Strategy
Franke, 2007	Innovation: The winning formula to regain profitability in aviation?	Strategy
Suzuki, 2003	Airline frequent flyer programs: equity and attractiveness	Strategy
Janic, 2004	An application of the methodology for assessment of the sustainability of the air transport system	Sustainability
Janic, 2002	Methodology for assessing sustainability of an air transport system	Sustainability

Review of results in sample

This section will provide an overview of the results presented within the sample. Several approaches forming one framework are used to analyse the sample. Given the restrictions in terms of latitude and depth, it is more important to illustrate the proposed framework for later research. The overview given presents the results from selected research works. It is not the objective to provide a complete overview of all literature but much more to show what kind of results literature does provide on several topics.

The category “general topics” can involve the following criteria: General, Regulation, Alliances, Performance Comparison, Network, Market Development, Sustainability and Strategy.

“General” includes all sampled literature that either did not match any of the other criteria or referred to very broad topics.

“Regulation” is chosen for publications that consider aspects of regulations in terms of ex-post or ex-ante impact analysis for one more changes in the legislative environment of airlines.

“Alliances” includes those articles that analyze the impacts of cooperation between airlines, beginning with code-sharing (the simplest form of cooperation) and ending with strategic partnerships, e.g. indicated reciprocal investments of the partner companies into each other.

“Performance Comparison” refers to all literature that relates and compares the outcome of operations or more aggregated results, for instance regarding social welfare outcomes.

“Network” refers to all choices of airlines which airports are to be served during its course of business and which interconnections exist.

“Market Development” indicates considerations on the development of regional or global markets over time be it past, present or future periods. Hence forecasting would be included in this sample as well.

“Sustainability” refers to literature on questions of the impact of the aviation sector on the environment and the society as a whole.

“Strategy” refers to literature considering the key competencies of airlines or long-term choices such as the reaction to significant changes in the business environment or those involving significant opportunity cost trade-offs.

There are five publications reviewed on alliances of airlines. Three of these are from Tae Oum, an author with a very extensive list of publications on productivity, performance of airlines and airports and other aviation related topics. These three are complemented by one publication from Gudmundsson and Rhoades and one from Vowles.

The latter shows in his analysis how different alliances on the US airline market would create different traffic patterns and (regional) market dominating positions for some cooperation, especially that of a potential alliance between Northwest Airlines and Continental which would generate the biggest overall net benefit (Vowles, 2000). Gudmundsson and Rhoades explore the determinants of alliance survival and conclude that further research would be needed to ensure the full descriptive and determining criteria for airline alliances survival. But it is concluded, that international airlines do need to integrate alliances into their system as to gain access to new markets and to increase the connectivity of their network to be able to compete successfully (Gudmundsson and Rhoades, 2001). The first of the three publications of Oum explores factors influencing the stability and gives an overview of the most important aspects about airlines to consider: They allow for market access, enhance profitability, represent a lock-in effect through the costs connected to switching or leaving an alliance and are more unstable if one side gets involved more than others. Also, Oum predicts the world market to concentrate to about 5 global airline alliances (Oum and Park, 1997)

Together with Zhang in 2001, Oum publishes additional findings on airline alliances. These are the continued and expectedly growing stability of airline alliances, next to 4 major alliances there is potential for one additional airline, strategic alliances can generate significant cost savings (in contrast to tactical partnerships), significant additional traffic volumes. For the airline under detailed review, Air Canada, Oum and Zhang expect an increase in the airlines relative inefficiency as to its near-monopoly situation in its home-market (Oum and Zhang, 2001). With a very strong empirical approach, Oum and various colleagues show in 2004 extend the work on the effect of airline alliances. They show that, dependent on the degree of cooperation within airline alliances, cost savings potentials from economies of scale and from access to better resources, but no significant impact on the partners profitability, which is a change compared to the opinions expressed 1997 and 2001 (Oum, Park, Kim and Yu, 2004).

The reviewed literature on airline alliances showed that the general points of the literature to test further through extension of the sample are the question of competition and its development from changed alliances. Changing alliances are partially explained by the various variables explored from Gudmundsson and Rhoades, the general consensus that alliances are crucial to gain market share and realize cost savings through sharing operations with alliance partners remains constant throughout the sample.

More general findings in the sample are not as focussed as the other publications under review but remain very important. First, Francis and Humphreys present their empirical results on the use of benchmarking in airlines in 2005 and show that there is use of this method almost throughout

the entire sector and also that the willingness to share information includes somewhat delicate information, e.g. regarding the maintenance of vital air plane parts or scheduling as airlines appear to see their network and its structure as their source of differentiation and therefore competitive advantage (Francis, Humphreys and Fry, 2005).

Gudmundsson shows in his work from 2002 that there is strong explanatory between the occurrence of financial problems of an airline and the age of its fleet as this affects the cost competitiveness, investment needs, financing abilities and relative market position of the service offered (Gudmundsson, 2001).

Suzuki shows in 2002 the major factors for optimal overbooking on the example of US major airlines: most passengers should be passengers whose business would be foregone otherwise, the degree depends on several operational factors of the airline considered and most importantly, there are various drawbacks to overbooking, most importantly a negative impact on market share in later periods (Suzuki, 2002).

The marker “General” is always more of a label for parts of the review that either did not fit anywhere else or that just are, too general. This refers especially for the work of Francis, et al. However, general results are that benchmarking is a day-to-day practice in airlines, that already an ageing (yet presumably fully functional) fleet suffices to hamper the competitive position of an airline. Also, overbooking reveals additional revenue sources but these are not without drawbacks in terms of decreased quality and therefore market share.

For market development topics, 6 publications have been sampled (three of Vowles, two of Swan and one of Suzuki, Tyworth and Novack).

As an extension to prior findings, Suzuki and his colleagues explore the relation ship between the service provided to the customers of an airline the provider' s market share. They show that there is a general relation between service and market share, as in better service going along with better market share. More importantly, they also show that if a minimum level of service is not offered, the delivery of service below a certain ranges causes dramatic changes in market share that is very hard to regain (Suzuki, Tyworth, Novack; 2001).

Swans works from 2002 and 2006 refer to the underlying drivers of market development and predict a stable continuing growth if no significant changes to the production process through most importantly technology or infrastructure occur (Swan, 2006). Also, he points out that throughout the reviewed time (since the 1970s); airlines saw a parallel decline of both cost and yield. These cost pressures are likely to hit the airport sector in the future (Swan, 2002).

The work of Vowles contains a geographical component. He shows that LCC, or at least Southwest in America, increase traffic volumes and lower fares where they operate (Vowles, 2000) and that even if they do not serve neighbouring airports at all, price levels throughout the region are affected (Vowles, 2001).

The presence of LCC is also a major determinant in the last publication in this part from 2006, where route type, the existence of LCC and the level of competition to be the factors influencing the fares between two hubs (Vowles, 2006).

These results for the part of the sample on market development show that the literature has strong acknowledgement of the importance of LCC for the markets of airlines, but also, that this is mostly the continuation of declining total cost and revenue levels for the past decades. Service level appears to remain with the potential of differentiation although it appears to be the key conclusion that is not too important what service levels is provided (as there are many factors determining business and profitability) but that not matching minimum service levels can turn out very harmful.

Regarding network decisions, the results of the research from 1994 show the significant impact of airlines in Europe; as the expectations of Dennis do not include LCC at all, but rather predict the increase of hubs in size and numbers in Europe. Also, Nigel assumes that there will be consolidation in the European airline market. Oum, Zhang and Zhang found a year later that airlines have an incentive to accumulate traffic in hubs to generate local market power and deter entry (Oum, Zhang and Zhang; 1995) pointing at the importance of network decisions for airline not only in terms of covering different markets but also in terms of gaining access to some areas exclusively. Gudmundsson and Lechner show in 2006 that airline alliances are more beneficial if the networks are more complementary and there is a way to allow for shared sourcing for relevant inputs by making inter-company cost comparisons possible and practicable (Gudmundsson and Lechner, 2006).

The results of this admittedly small extract show that network decisions are another of the determinants of airline success, not only in terms of an airline's market range, but also in terms of deterring competition and in terms of gaining superior market dominance from optimizing alliances and their networks.

The sample on "regulation" shows results of research from the 1990s as this is the period in which the impacts of deregulation in the two most important airline regions, the US and Europe, became both clear and comparable.

Baltagi, Griffin and Rick show in their 1995 work that deregulation has caused an increase in cost efficiency by comparing data from before an after deregulation (Baltagi, Griffin and Rick, 1995). Good, Roeller and Sickles show in the same year that an efficiency increase of same relative magnitude (or \$ 4 bn) can be expected for EU airlines (that were much less efficient than American airways. Morrell depicts the results in the EU in more detail and depicts the overall development to be less than expected but also that there is progress in that direction (Morrell 1998). 10 years earlier, Kahn had already referred to the overall outcome of deregulation in the US and shown that there, despite very significant falls in prices and an increase in choice, some aspects, especially congestion, did not improve in the period after the US deregulation (Kahn, 1988).

It is obvious that mere four sources cannot and will not give a coherent picture of deregulation, its conditions and its outcomes. However, the results show that the complex business with its various interdependencies, within and between airlines, exogenous influences and the relevant infrastructure.

Strategy is understood to be the long-term direction a business is steered towards. Given the increasing competition pressures, this area becomes increasingly important and embraces the above mentioned issues to the most part. Here, four quite recent publications are reviewed as it appears important to focus on current issues given the limitations of this work.

Suzuki points out in his work on FFP that airlines are able to enhance their competitiveness by adjusting their FFP to the travel patterns of their passengers. It is also shown that these high-yield passengers are formally interconnected, especially through the internet (Suzuki, 2003).

Markus Franke shows in his work that network carrier need to fine tune their network approach to decrease congestion and increase service levels by depeaking (in response to the challenges from Low Cost Carriers (Franke, 2004). He continues this approach in 2007, where the ability to innovate is shown to be key to regain innovation as mere cost-cutting cannot generate the needed consistently strong and big enough revenue basis with sufficient differentiation from the competition (Franke, 2007). The same year sees the analysis of the transferability of a "no-frills" approach to long-haul travel. It is shown that there would be limited scope for cheaper fares

compared to current levels and that it remains to be proven that there are passengers willing to leave out in-flight services if the flight time is significantly longer than on the average LCC-stage (Francis, Dennis, Humphreys and Ison, 2007).

Again, this selection is a mere scratch at the surface of what is available, but it is intended to show that on top of literature referring to parts of the airline business such as regulatory aspects, market development analysis, etc., there is a significant share of literature revising and analysing the long-term aspects of the airline business.

An even more aggregated topic is that of sustainability. Janic develops and applies in two publications a wide-set framework analyzing the needs and interests of all stakeholders in the airline business, including local communities, airports, governments, etc. The framework provides a wide set of indicators and operational measures to allow for an assessment of airline activity on the society (Janic, 2004 and Janic, 2006).

The overall impression from the reviewed is that literature on airline benchmarking reflects on the complexity resulting from applying a complex method to an even more complex sector. The initial expectation, that most of the literature would rather follow the trend of past developments and show mixed results in ex-ante analysis could be confirmed. For the different topics, it shows that there is more than one view on several topics and that there is wide range of perspectives.

Discussion and Conclusion

The initial criteria named for a useful publication are only given for a minority of the activities. The table below shows an assessment of the author as to the criteria of a solution transferable to management issues.

Unfortunately, further assessment would need more time and scope to provide a sufficiently good assessment of the criteria but is expected that in most cases the relevant parts of the value are properly reproduced and also that the method is applicable. The latter aspect is to be understood that is not aim of this work or later research to write a manual on “the right kind of research” for a given topic but much more to assess if the method applied makes sense. Given the expanding amount of scientific approaches and therefore also the exponentially growing amount of possible combinations, this would not be feasible for this stage of work.

The assessment criterion for “Manageable Solution” is if the content of the publication provides either a tool (formula, model, etc.) or information that may be useful to a fictional airline management member. Out of 28 publications, only 8 are considered to deliver a non-transferable solution, but it should be not noted that this includes information on market developments, etc. too. Real blue-prints for management can be expected from the work of Suzuki on overbooking and service level, from Francis et al. on the transferability of the LCC model and from Franke on the strategic need for innovation and also on ways to counter competition from LCC. All other sources provide valuable information, but always under the restrictions of the sampled data within these publications. Therefore, the relatively high share of indicators pointing at manageable solutions points at a majority of information provided rather than managing schemes provided.

Table 5 Assessment of sampled literature

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Authors and Year	Title	General Topic	Manageable Solution
Gudmundsson, Rhoades; 2001	Airline alliance survival analysis: typology, strategy and duration	Alliances	N
Oum and Park; 1997	Airline Alliances: current status, policy issues, and future directions	Alliances	N
Oum and Zhang; 2001	Key aspects of global strategic alliances and the impacts on the future of the Canadian airline industry	Alliances	N
Oum, Park, Kim; 2004	The effect of horizontal alliances on firm productivity and profitability: evidence from the global airline industry	Alliances	Y
Vowles; 2000	The geographic effects of US airline alliances	Alliances	Y
Francis, Humphreys, Fry; 2005	The nature and prevalence of the use of performance measurement techniques by airlines	General	Y
Gudmundsson; 2002	Airline Distress Prediction Using Non-Financial Information	General	Y
Suzuki, 2002	An empirical analysis of the optimal overbooking for US major airlines	General	N
Suzuki, Tyworth, Novack; 2001	Airline market share and customer service quality: a reference-dependent model	Market Development	Y
Swan; 2002	Airline route developments: a review of history	Market Development	Y

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Swan; 2006	Misunderstandings about airline growth	Market Development	Y
Vowles; 2000	The effect of low fare air carriers on airfares in the US	Market Development	N
Vowles; 2001	The “Southwest Effect” in multi-airport regions	Market Development	Y
Vowles; 2006	Airfare pricing determinants in hub-to-hub markets	Market Development	N
Dennis; 1994	Airline hub operations in Europe	Network	N
Gudmundsson, Lechner; 2006	Multilateral airline alliances: Balancing constraints and opportunities	Network	N
Oum, Zhang and Zhang; 1995	Airline Network Rivalry	Network	Y
Baltagi, Griffin and Rick; 1995	Airline Deregulation: The cost pieces of the puzzle	Regulation	N
Good, Roeller, Sickles; 1995	US Airline Deregulation: Implications for European Transport	Regulation	Y
Kahn, 1988	Surprises of Airline Deregulation	Regulation	N
Morrel, 1998	Air Transport Liberalization in Europe: The Progress So Far	Regulation	Y
Francis, Dennis, Humphreys, Ison, 2007	The transferability of the low-cost model to long-haul airline operations	Strategy	Y
Franke, 2004	Competition between network carriers and low cost carriers – retreat battle or breakthrough for a new level of efficiency	Strategy	Y
Franke, 2007	Innovation: The winning formula to regain profitability in aviation?	Strategy	Y

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Suzuki, 2003	Airline frequent flyer programs: equity and attractiveness	Strategy	y
Janic, 2004	An application of the methodology for assessment of the sustainability of the air transport system	Sustainability	y
Janic; 2002	Methodology for assessing sustainability of an air transport system	Sustainability	y

This work is representing research in progress and has to cope with severe limitations regarding size, depth and latitude of research and progress of analysis. It has been attempted to build the foundations for a model that allows categorizing and assessing literature on airline benchmarking. This was successful in so far, as the method of benchmarking and the airline market in its development could be depicted in a rough picture. The same is valid for the differentiation of the measurement methods.

Further research questions will address the following issues:

- develop a set of further indicators to categorize the publications
- develop a framework to assess the extent to which a published scientific solution or analysis can be transferred into day-to-day business
- Extend and validate the literature sample beyond the current ca. 400 publications assembled so far
- Identify further influences on the methods applied, the concept of benchmarking and the airline market
- Develop an analysis that allows the assessment of the impact of individual publication on following ones, e.g. by visualizing quotations and references
- The overall objective remains to seek out inconsistencies in the literature and to close the gap between science and business.

The author appreciates any kind of feedback on this paper as any input will be considered helpful in achieving the objectives displayed above.