BUSINESS AVIATION IN EUROPE – CURRENT STATE AND FUTURE OUTLOOK

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Abstract:

The small number of scientific publications on business aviation identified by an intense literature review reveals that there is a lack of awareness among aviation researchers for this high-growth, high-yield segment. Especially an up-to-date market analysis reflecting the individual characteristics of business aviation as well as a corresponding outlook on its potential future developments are missing. In this paper a STEP analysis based on secondary data is conducted to assess the European market environment followed by a Porter five forces analysis based on secondary data and expert interviews to assess the current state of European business aviation. In order to give an industry outlook, the Delphi methodology is applied and the findings of an extensive future study on the business aviation future in the year 2025 are presented. The sample consists of 57 aviation strategy experts with an average industry experience of over 22 years evaluating future projections. For this purpose, an innovative Real-Time Online-Delphi methodology has been used. The major contribution of the paper is the development of an up-to-date business aviation market analysis as well as an elaborated outlook on the anticipated business aviation future, which provides a valuable basis for strategy development.

1 Introduction

The European Business Aviation market ranks second in the world in terms of size, right behind the US Business Aviation market. Although the number of potential clients is rather limited due to the comparably higher travel costs, this market segment has seen considerable growth in many European countries over recent years (Kern. 2008), except for times of financial and economic crises. The growth rates in previous years have attracted prospective market actors who showed an interest for diversification of the existing market by developing new business models. The strong growth has furthermore led to an increased attention that the Business Aviation market receives from the scientific community. However, the quantity and the scope of these studies are still quite limited. Moreover, they are usually not explicitly referring to the European market or they are outdated, so that this market remains largely unexplored. The European Commission has recognized the relevance of Business Aviation and the lack of data. For that reason, the European Commission has mandated the European Civil Aviation Conference (ECAC) to conduct a study on available data and to make suggestions for further data collection (EC, 2007). A market analysis based on strategic criteria is still missing. Therefore the purpose of our paper is twofold: Firstly, to deliver an analysis of the current state of the European Business Aviation market based on strategic criteria, and secondly, to give an outlook on possible future developments of this market up to the year 2025.

1.1 Methodology

For our research we first conducted a PEST[1] analysis to investigate on a macro level the environment that the Business Aviation market is embedded in. Then Eurocontrol IFR[2] traffic data was analyzed to show the development and current size of the market, followed by a Porter five forces analysis based on secondary data and expert interviews. The industry outlook is based on the findings of an extensive Delphi-based scenario study on the Business Aviation future in the year 2025 which will be described in more detail.

The Delphi method is a judgmental forecasting procedure in the form of an anonymous, written, multi-stage survey process (Delbecq et al., 1986; Linstone, Turoff, 1975; Rowe, Wright, 2001). The Delphi method aims at systematically fostering expert consensus about

[1] PEST stands for political, economic, social and technological factors, see section 2.

[2] Instrument flight rules.

future developments, which are formulated as short and concise future projections. The Delphi process employed in this paper is based on the classical procedure from RAND Corporation, which is the most approved and accepted variant of the Delphi method (Dalkey, 1967, 1969) and follows the multi-stage process proposed by Bood and Postma (1997):

First, 25 future projections were developed in two expert workshop sessions and via additional secondary data desk research. Pretesting to ensure reliability as well as content and face validity was performed at two stages in the Delphi process. First, after their initial formulation, the projections were assessed by two internal experts, who checked for completeness and plausibility of the content as well as methodological soundness. To ensure methodological rigor the projections were checked for ambiguity and precise wording was used to guarantee specificity in formulation without including too many elements (Salancik et al., 1971). In addition, conditional statements were avoided by making the primary question dependent on the fulfillment of a series of conditions or by urging experts to evaluate the two parts of the projection in the same manner, even if they had a different opinion on each statement. If a projection was formulated with conditions, it was split into two projections. Second, after completion of the questionnaire design, another pretest was conducted by a monitoring team of 17 external industry experts (Turoff, 1975). The final set of projections is depicted in table 1.

No.	Future Projection
1	There will be rising demand for “easy” air transportation to avoid wasting time.
2	Travel budget cuts will force the increased use of low-cost carriers for business travel.
3	Customers will increasingly demand integrated services, door-to-door, out of one hand (one-stop-shopping).
4	The use of Business Aviation will be accepted by society.
5	Business Aviation benefits will be less valued in short-haul markets than in long-haul markets.
6	Demand for transportation within, from, and to emerging countries will be the major growth driver in the Business Aviation industry.
7	Long-haul national and international transport will grow faster than short-haul international, national and regional transport.
8	Low-cost carriers will grow faster than Business Aviation providers in short haul markets.
9	The demand for Business Aviation will exceed the projected annual growth rate for general air transportation.
10	Business Aviation will provide access to remote areas like free trade zones and export processing zones.
11	The members of the Business Aviation transport chain (airlines, airports, ATC, etc.) will collaborate in system partnerships.
12	Business and corporate jets will be managed collectively in pools. Fractional ownership will become common.
13	Dedicated Business Aviation airports will evolve.
14	Very light jets (VLJs) and air taxi services will increasingly be used to accommodate short-haul demand and individual requirements.
15	Medical air transportation in chartered business jets will grow rapidly.
16	Business jets will be increasingly utilized for emergency freight transportation.
17	Legally binding emission rights and trading policies will be established for air transportation.
18	Problems related to the scarcity of fossil fuels will not be resolved.

19	The vulnerability of the Business Aviation industry will increase due to unexpected events.
20	The growth of the Business Aviation industry will be limited due to capacity constraints.
21	The liberalization and deregulation of aviation markets will be nearly completed.
22	Virtual meetings, telephone conferences, and video conferences will increase tremendously.
23	Business Aviation will be substituted by land transport in short-haul markets.
24	New smaller aircraft and jet types will allow long-haul and transatlantic point-to-point flights, thereby bypassing hubs.
25	International (satellite-based) air traffic control will be available.

Table 1: Projections on the future of Business Aviation 2025

Second, aviation experts were identified, evaluated, selected, and recruited for participation in the Delphi survey. It was aimed to include at least 20 to 30 participants, a recommended panel size for Delphi surveys including quantitative and qualitative data collection (see e.g. Parentè, Anderson-Parentè, 1987; Skulmoski et al., 2007). The improper selection of experts is considered the most severe validity threat in Delphi research (Creswell, 2003; Hill, Fowles, 1975). The initial pool of potential experts for this study comprised 80 airline strategists, C-level managers, aviation researchers and aviation consultants from companies all over the world. For each of the expert candidates, a score was calculated to reflect their individual expertise. The scores were based on a set of criteria including the management level, job specialization, functions inside and outside of the organization and industry expertise in years (Delbecq et al., 1986; Lipinski, Loveridge, 1982; Mehr, Neumann, 1970). In total, 57 experts (71%) from 80 intended experts agreed to take part in the Delphi survey. As depicted figure 1, 42% of the 57 participants had expertise in Passage, whereas 25% had a Business Aviation and 33% an Air Cargo background. On an average the experts offered 22.7 years of industry experience.

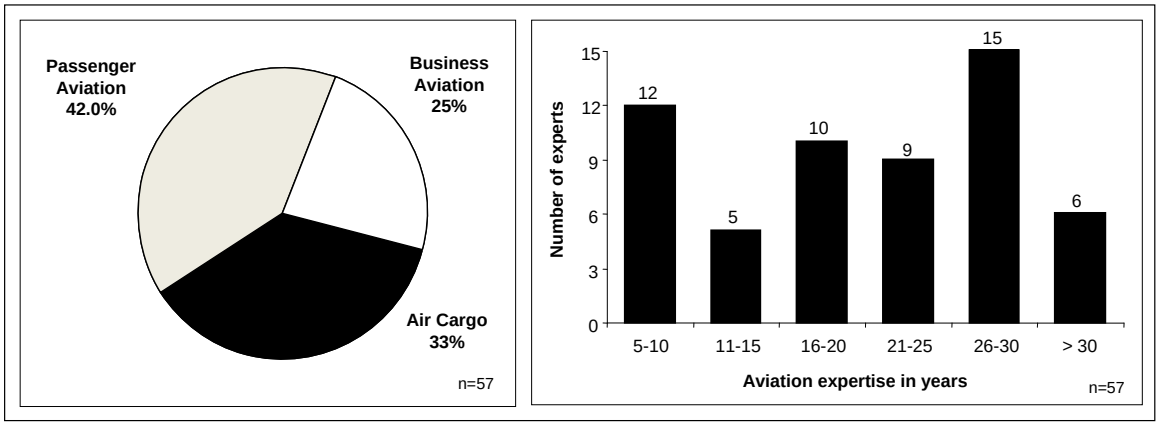

Figure 1: Characterization of the Delphi sample (Industry background and industry expertise in years)

Third, the projections were evaluated online by the experts, followed by an automated interim analysis of the statistical group opinion and aggregated arguments.

Fourth, the experts were asked to revise their first round estimations based on the feedback of the interim results in real-time. Up to five Delphi and revision rounds were possible in total. The research fatigue was kept as low as possible, which, in turn, assured a higher response rate and validity of the data (Mitchell, 1991). All experts took part in at least two Delphi rounds corresponding to a drop-out rate of 0%. On an average 3.1 Delphi rounds were conducted. The fact that all of the experts participated in the second round indicates a high level of satisfaction in terms of survey content and questionnaire design. It is reasonable to assume that a high level of satisfaction increases commitment and involvement, which inevitably results in high survey data quality. In addition, numerous researchers have revealed that the major opinion of the study changes over time and, therefore, the most reliable study value occurs after the first iteration (see e.g. Rowe, Wright, Bolger, 1991; Woudenberg, 1991).

After the closure of the online Delphi survey, a hierarchical cluster analysis was conducted in order to identify structures and similarities in the Delphi data. To identify possible clusters in the data, the data was processed with the statistics software package SPSS version 19.0 and the average linkage within groups method with the simple Euclidean dissimilarity measure was applied. The variables considered in the cluster analyses were the mean values of expected probability (EP) and impact (I) of every projection. Numerous authors have argued that clustering along these two dimensions is reasonable to derive appropriate actions and strategies (see e.g. Akkermans et al., 2003; Häder, 2002; Ogden et al., 2005; Rikkonen et al., 2006). Furthermore, we transformed the values of *probability of occurrence* and *impact* by standardising variables into Z-scores as they were on different scales. Finally the clustered future projections were mapped in a strategic future map according to their estimated probability of occurrence and their estimated impact on the Business Aviation industry.

Standardization and pretesting are considered to be the most effective means to ensure reliability in Delphi research (Kastein et al., 1993; Okoli, Pawlowski, 2004). Therefore standardization was implemented in all Delphi processes: The definition of research aim and scope, the structuring of the scenario field, the expert selection, the development of projections, and the interim analysis followed phase-based standard procedures. In addition,

the entire online survey process was strongly standardized since it was planned and executed in line with the Total/ Tailored Design Method (Dillman, 1978, 2006).

1.2 European Business Aviation: definition and market demarcation

According to the German Business Aviation Association (GBAA) the European Business Aviation comprises the civil, non-scheduled traffic for internal company purposes only as well as the commercial operation of business aircraft for the purpose of transporting people and goods between the European states and between European and non-European states. Due to data restrictions, in our case the term Europe refers to all EU member states, except Estonia, Latvia, Lithuania, and Poland, but additionally includes Switzerland, Norway, Croatia, Macedonia, Moldova and Turkey. The International Business Aviation Council (IBAC) distinguishes between "corporate" and "owner operated" business models. Whereas in the latter model all flights are operated by the aircraft owner him- or herself, the corporate model means that the owner employs a professional crew for operating the aircraft. Commercial operation refers to all private or business-related flights that are carried out by operators in possession of a commercial license as part of their business (IBAC 2002). Consequently the IBAC includes in its definition of Business Aviation not only company-internal traffic but also other kinds of traffic generated by air taxi, charter, jet membership, and fractional ownership operators.[3] There is currently no consensus among researchers and practitioners whether to consider Business Aviation as part of the General Aviation or Commercial Aviation segments. According to the ICAO definition of General Aviation, all corporate and owner operated flights for internal company purposes only can be considered as General Aviation traffic. Business Aviation services that are offered by company-external operators are clearly profit-oriented and can therefore be seen as part of the Commercial Aviation segment. In any case the business class only flights offered by some airlines are not part of the Business Aviation segment, for these are scheduled flights and not ad hoc traffic for individual purpose.

In our traffic analysis in section 3 we use Eurocontrol data which only includes IFR flights. Eurocontrol defines Business Aviation in Europe according to a list of specific aircraft types. Despite these restrictions, the Eurocontrol data constitutes a very close proximation to the actual Business Aviation traffic in Europe.

[3] These business models will be explained in detail in section 4.

2 Strategic environmental analysis

The strategic environmental analysis is based on a PEST analysis, which is a framework of external factors used to describe the macro-environment of an individual company or a market segment. The acronym PEST stands for the factors included in such an analysis: political, economic, socio-cultural and technological factors (Wilson, Gilligan, 2008). Other factors have been added to this basic model over the course of time, e.g. legal considerations. In our study we added an ecological component and considered legal aspects in the political domain.

2.1 Political-legal factors

As mentioned before, the market segment under consideration does neither include all EU member states nor exclusively EU member states. However, the European Community Law has a large impact on this sector, because for the most part the Business Aviation flights are carried out within and between EU member states.[4] Although Switzerland and Norway are not members of the EU, they are subject to the regulations of the European Aviation Safety Agency (EASA), which was founded in 2003 as a successor of the Joint Aviation Authorities and since has taken over air safety-related competencies from the member states. Its tasks include the development and enforcement of the highest possible safety and environmental standards in the European civil aviation as well as licensing flight personnel.

The relevant political-legal environment is characterized by an increasing influence of EU law. This is for instance the case when it comes to slot allocations at 30 European airports with austere capacity limits. The EU Regulations 95/93 and 793/2004 are designed to implement the principles of transparency, neutrality and non-discrimination in the slot allocation process (Stockmann 2009). Another infrastructure-related issue on the EU level is the Single European Sky (SES) initiative aiming at an efficient air traffic control system on a European scale instead of the current national scale, which will allow for a better use of capacities on air routes. Another EU directive (2003/96) regulates that commercial operators of flight services are exempt from fuel taxation, whereas company-internal flights are not.

Finally, national legislation has an influence on Business Aviation operators. Not only are individual states responsible for issuing Air Operator Certificates (AOCs), they also have an impact in location and business model decisions due to their respective taxation.

[4] See section 3.

2.2 Economic factors

The Common European Market of all 27 EU member states is the world's largest economic region with a high purchasing power among individuals and companies and thus creates a generally favorable environment for the Business Aviation sector. The expected enlargement of the EU along with an increasing internationalization of companies will most likely lead to the development of new subsidiaries which will potentially be located away from the existing scheduled air traffic. Although accessibility by air is an important location factor for internationally active companies and they consequently prefer locations close to existing, well-connected airports (Arndt et al., 2009), their relocation decisions might be influenced by public subsidies and lower productions costs at remote locations.

The financial and economic crises have resulted in severe decline in the European economic performance. The economic pressure led to a decline in business activities and an increasing cost pressure. Especially travel budgets were the first to be cut (Görgen, Weyer, 2009). Since banks were especially affected by the crisis, their loans to private equity investors were only given with high risk premiums. This led to a decrease of mergers and acquisitions, a business which usually includes a high travel volume. Difficulties regarding the availability of loans also affected aircraft manufacturers and operators. The economic crises affected the incomes of the so-called High Net Worth Individuals (HNWIs) who have more than 1 million US Dollars available for consumption and constitute an important clientele for Business Aviation operators.

2.3 Socio-cultural factors

The European Society is increasingly aware of ecological issues, and a sensible behavior in this regard is expected from companies. On the other hand mobility is more and more taken for granted and is more important than ever before (EC 2008). Low Cost Carriers have had a tremendous impact on leisure travel behavior and developed a new market segment by introducing low fares which made air transport available for large parts of society (BAA 2006).

Nevertheless, the public opinion of the use of business aircraft is rather critical. Whereas in previous times of economic growth travelling in a business jet was considered an appropriate status symbol for managers, nowadays this view has changed. Business jets are in the public opinion no longer seen as a necessary and efficiency-improving means of transport but as a

superfluous luxury good. In times of economic crisis, where the future of a company is uncertain and unemployment increases, it seems inappropriate for managers to travel in private jets.

This sudden image change is furthermore enforced by ecological considerations, because there is a widely spread public opinion that aviation has a specially negative impact on climate change (Harmeling, 2007; Sterzenbach, Conrady, Fichert, 2009). Although small business aircraft use less fuel than large commercial aircraft in total, they are less fuel-efficient in terms of fuel consumption per passenger and kilometer (Conrady, Buck, 2008).

2.4. Technological factors

The technological framework of the European Business Aviation industry is not all that different from other world regions (Flight Global 2008: 24). The aforementioned EASA is responsible for licensing aircraft for use in Europe, and aircraft manufacturers take European regulations into account when designing their products for the global markets. The introduction of a new generation of aircraft, the Very Light Jets (VLJs) in 2007 strongly influences the technological environment. VLJs not only cost less than 20 per cent of traditional business aircraft, they also have lower operational costs. These aircraft are licensed for single-pilot operation, they are very light[5] (as their name suggests), therefore fuel-efficient, and they can use short runways of a length of 900 meters while carrying three to six passengers. (Biermann 2007; Schulte 2008; Butterworth-Hayes 2009)

2.5 Ecological factors

The ecological environment of the Business Aviation industry is mostly defined by a scarcity of resources, the CO_2-induced climate change and noise-related restrictions at airports. Not only is crude oil – which is the basic ingredient of jet fuel – a finite resource, the increased demand has led to a high volatility and a generally increasing tendency of oil prices. The increasing air pollution and the climate change have resulted in stricter environmental protection needs. In 2012 the air transport industry will be included in the European Emission Trading Scheme (ETS), which will affect all flights originating or ending at an airport within the EU (EC 2008; EP 2008). Only aircraft with a Maximum Take-Off Weight of less than 5.7 metric tons will be exempt from the ETS (Deutsche Emissionshandelsstelle im

[5] Maximum Take-Off Wight of 4.54 metric tonnes.

Umweltbundesamt, 2010). Since some aircraft that are used for Business Aviation are below this limit, this sector will not be affected in total.

Another important ecological factor is noise emission, which is increasingly regulated at certain airports and leads to strict night flight restrictions at these locations.

3 Traffic analysis

Business Aviation flight movements rank third among all IFR movements in Europe with a total share of 7.5 per cent. Traditional scheduled services still make up the largest proportion (58.3 per cent), followed by low cost flights (20.4 per cent). Some 70 per cent of all Business Aviation flights can be attributed to six countries: France, the United Kingdom, Germany, Italy, Spain and Switzerland.

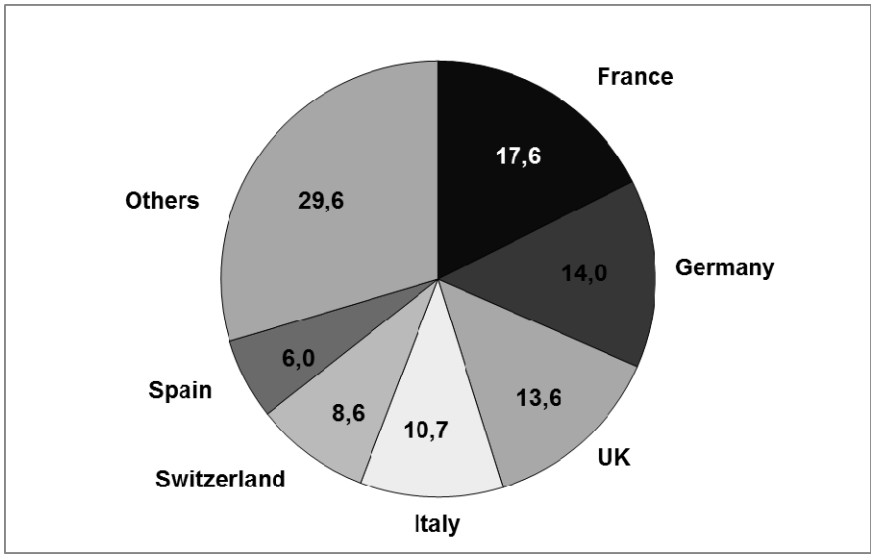

Figure 2: Country shares of all Business Aviation movements in Europe in 2010.

Flight movements in the Business Aviation sector in Europe increased from 2001 to 2007 by almost 50 per cent. This development was influenced by several factors, most importantly the increasing purchasing power of individuals and companies as well as the internationalization of companies resulting from the continuing globalization (Eurocontrol 2008a).

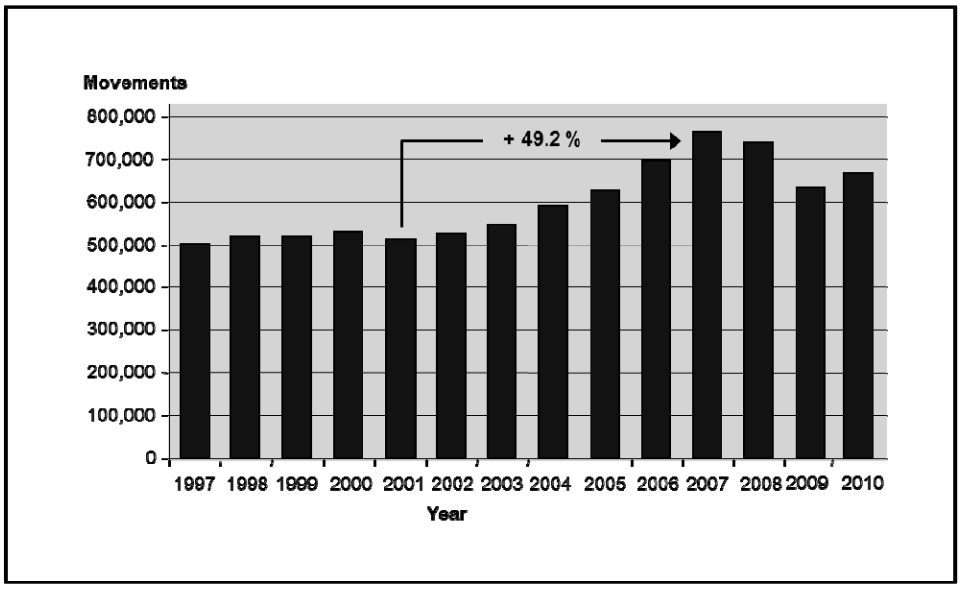

Figure 3: Total volumes of Business Aviation movements in Europe from 1997 to 2010.

Almost one third of all Business Aviation flights in these six countries are domestic flights (except for Switzerland due to the comparatively small size of the country) and two thirds are international flights. Most of these flights involve economic centers and holiday destinations. An interesting finding is that in times of the economic crises traffic declined on most established routes, and at the same time there was still growth to be observed in the Eastern and Central European markets. The following map shows the 500 most frequented bi-directional Business Aviation routes.

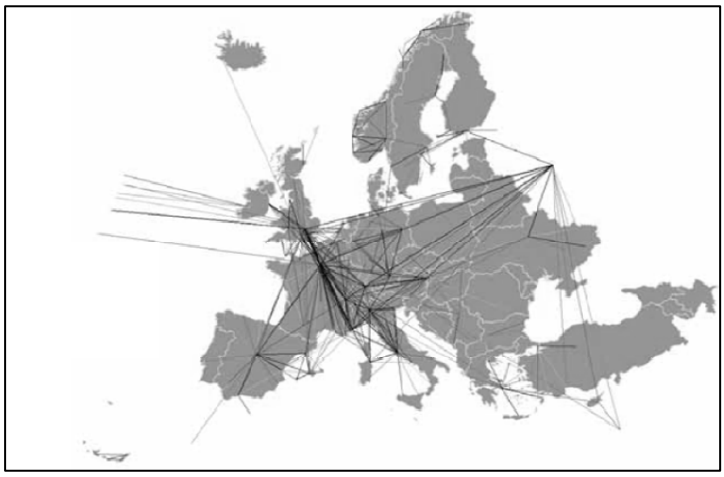

Figure 4: The top 500 bi-directional Business Aviation routes in Europe
Source: Eurocontrol, 2008a.

An analysis of the distances of Business Aviation flights based on Eurocontrol data shows that 45.2 per cent of all flights cover distances up to 500 km, 44.4 per cent range from 500 to

2000 km, and 10.4 per cent cover more than 2000 km. The most common distance (mode value) is 300-400km, which constitutes 12.3 per cent of all flights.

4 Business models

On the European Business Aviation market there are four different business models that users can choose from: Full Ownership, Fractional Ownership, Charter/Air Taxi, and Jet Membership Programs.

Full ownership is the most intensive way to participate in Business Aviation, meaning that a business jet is either fully owned by the user or such an aircraft is maintained and operated by a service provider for exclusive use by the owner. This model can be appropriate if the user needs at least 400 flight hours per year (Sheehan, 2003; HSH Nordbank ,2005). For an annual need between 50 and 400 flight hours, the fractional ownership model is considered the most suitable. Several investors purchase shares of an aircraft with a single payment. The shares are expressed in hours of use, 800 hours per year being the base. The minimum share size is usually one sixteenth, i.e. 50 hours of use (Moreton, 2007). The advantage of this model over the full ownership is that less capital is needed and all tasks associated with maintenance and operation of the aircraft are split among all users and need not to be paid by a single user only.

The charter/air taxi business model is the most common model in Europe. Charter flights include the aircraft and the crew and can be booked via a broker or via the operator directly. This model is the most economic one for an annual flight contingent of up to 100 hours and an average of four passengers. In air taxi flights not the entire aircraft is booked but individual seats only (Kern 2008; Krüger, Reise, 2005; HSH Nordbank, 2005). The jet membership or jet card models are similar to prepaid mobile phone plans. They allow customers the use of a certain range of aircraft types within an defined period of time and are most economic for an annual use of up to 50 hours. These cards are usually sold from 25 hours onwards (Kern 2008).

The most important determinants for choosing between these models are budget restrictions, the intensity of using the aircraft in terms of flight hours, the distances to be covered, the availability of suitable aircraft and the average number of passengers per flight (HSH Nordbank, 2005; Bachmann, 2004; Sterzenbach, Conrady, Fichert 2009). The following chart shows the suitable business models considering the criteria intensity of use and flexibility.

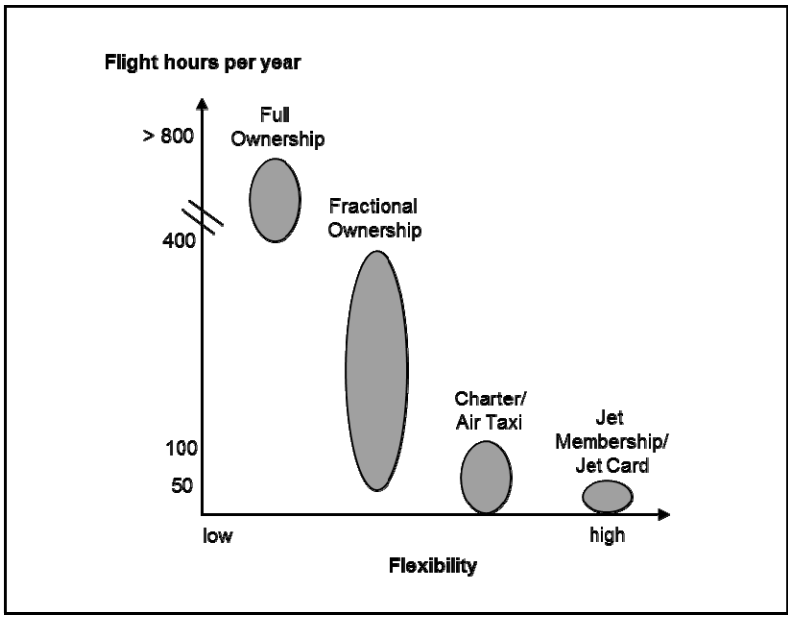

Figure 5: Business models and intensity of use

Source: based on HSH Nordbank, 2005.

5 Structural analysis of the Business Aviation sector

Our analysis of the structure of the European Business Aviation market is based on Porter's Five Forces model, which states that the intensity of competition within an industry sector not only depends on rivalry between the current market actors, but four more forces which influence the competitors from the outside. These forces are the entry of new competitors, substitute products or services, the bargaining power of customers (buyers), and the bargaining power of suppliers. The intensity of each of these forces has an influence on the competition within an industry sector (Porter, 2004). The results of our analysis are based on literature research and expert interviews among airlines representing all of the business models mentioned in section 4.

5.1 The intensity of competitive rivalry

Competition in the European Business Aviation market is very intense in all market segments due to the fact that Business Aviation is not a mass product but addresses a rather limited number of potential clients who can afford this kind of transportation. There is some variation in the different target groups and the respective additional services of the Business Aviation suppliers, but the core product, i.e. the ad hoc transportation from A to B, is mostly identical. The price of the air services is the means of competition. High growth rates and prospective profits in previous years have attracted new players in the market, in a time when demand

started to decline in the course of the financial and economic crises, eventually leading to overcapacities which intensify the competition even more.

5.2 The threat of the entry of new competitors

The interviewees see only a little chance of new competitors entering the market. Market barriers are comparatively high, especially when it comes to financing. The high capital needs and the high risk associated therewith make finding possible investors very difficult. Another obstacle is the establishment of structures that allow for the commercial operation of an aircraft. Business Aviation is a comparatively complex sector which requires certain safety standards and the know-how of skilled professionals. It usually takes several months to set up these structures and to acquire the necessary Air Operator Certificate.

5.3 The threat of substitute products or services

Scheduled air services, high speed rail services, traveling by car and the use of video conferencing are potential substitutes for Business Aviation services. Scheduled flights are the only substitute when it comes to covering long distances. The traffic analysis in section 4 has shown that most business flights range around 300 to 400 kilometers, which brings ground transportation into play, especially high speed rail services between economic centers (Collis, 2007; Eurocontrol, 2008c). The same holds true for traveling by car, provided the car is driven by a chauffeur which allows the passenger to make use of the travel time for other purposes than focusing on driving. Video conferencing is mostly a substitute for company-internal matters. Top management meetings and meetings with clients continue to depend on face-to-face contacts (Arndt et al., 2009). The interviewees additionally noted that substitutes have gained more importance in the financial and economic crises due to cuts in travel budgets.

5.4 The bargaining power of customers (buyers)

The bargaining power of customers on the European Business Aviation market is limited in terms of transparency on the costs and the age of the aircraft employed. Unlike in the scheduled services segment, there are hardly any publicly accessible platforms for information on flight prices. Although Business Aviation operators try to benefit from the lack of transparency, they are willing to oblige to customer’s wishes to a certain extent. There are traditionally strong bonds between customers and operators. Nevertheless, the

overcapacities in the market as described in section 5.1 have altered Business Aviation from a seller's to a buyer's market.

5.5 The bargaining power of suppliers

Suppliers to the Business Aviation market are aircraft manufacturers and service partners, the latter including fixed base operators, mineral oil companies, catering suppliers, airports, air traffic control, flight planning service providers, and companies in the maintenance, repair and overhaul business. Regarding the aircraft manufacturers, the interviewees observed a change from a seller's to a buyer's market, especially due to an increase in the number of aircraft currently available on the used aircraft market. These overcapacities along with a decreased demand for new aircraft forced manufacturers to reduce prices and to improve leasing conditions.

The bargaining powers of service partners depend on the service provided. Airport handling (and for the most part fixed based operators) and air traffic control services have fixed rates and are not negotiable. The remaining service partners mentioned above have relatively high bargaining powers, depending on the local competition at the individual airports. Even mineral oil companies are said to be highly dependent on world market prices and thus have hardly any room for price negotiations.

6 Future outlook

The industry outlook is based on the findings of an extensive Delphi-based scenario study on the Business Aviation future in the year 2025. Based on the estimation of 57 aviation experts, the anticipated future development of the Business Aviation industry is outlined. Table 2 summarizes the Delphi statistics regarding the development of consensus after the two Delphi rounds. An analysis of the estimated probabilities revealed a decrease in the standard deviations (SD) of most of the projections after round two. Corresponding to the rational of the Delphi method, the feedback of the statistical group estimation and the experts' arguments for their estimation after round 1 resulted in a convergence among the expert panel's opinions and an increased consensus. The strongest convergence was measured for projection 14 (Very light jets). Its standard deviation decreased by 2.6%. Projection 22 (virtual communication), in turn, showed a slight increase in standard deviation of 0.7 %.

Bold font marks theses, where final consensus was reached.		**Estimated Probability (EP)**								**Impact (I)**
Thesis no. and short title		**Round 1 (n=57)**			**Round 2 (n=57)**					
		IQR	***Mean***	***SD***	**IQR**	***Mean***	***SD***	***Mean Change***	***SD Change***	***Mean***
1	"Easy" air transportation demand	**18.8**	79.7	8.5	**18.8**	75.4	8.4	-4.3	-0.1	3.8
2	Low-cost business travel	**30**	63.3	19.1	**30**	66.8	18.1	3.5	-1	3.5
3	Demand for integrated products	**20**	66.8	19.6	**20**	81.0	19.3	14.2	-0.3	3.9
4	Societal acceptance of Business Aviation	35	41.1	21.2	35	41.1	21.2	0	0	3.2
5	Lower value of short-haul Business Aviation	**20**	42.1	17.6	**20**	40.7	16.4	-1.4	-1.1	3.2
6	Emerging markets	**10**	83.3	9.8	**10**	78.6	8.9	-4.7	-0.9	3.9
7	Long-haul growth > short-haul growth	35	67.9	18.2	**25**	77.1	16.7	9.2	-1.5	3.7
8	LCC growth > Business Aviation growth	**30**	68.6	15.4	**17.5**	76.4	13.8	7.8	-1.6	3.7
9	Business Aviation growth > general aviation growth	47.5	53.6	23.6	47.5	53.6	23.6	0	0	3.2
10	Business Aviation to remote areas	37.5	46.4	21.2	37.5	46.4	21.2	0	0	2.5
11	System partnerships	40	58	17.8	**20**	49.64	15.7	-8.4	-2.1	3.7
12	Jet pools and fractional ownership	37.5	66.4	20.7	37.5	66.4	20.7	0	0	3.3
13	Dedicated Business Aviation airports	40	62.5	22.1	40	62.5	22.1	0	0	3.6
14	Very light jets and air taxis	**30**	48.8	18.2	**30**	44.29	15.7	-4.5	-2.6	2.9
15	Medical air transportation	45	46.4	24.6	45	46.4	24.6	0	0	2.6
16	Emergency freight	55	46.4	25.5	55	46.4	25.5	0	0	2.6
17	Emission rights	40	64.5	18.7	**30**	70.4	16.7	5.9	-2.1	3.3
18	Scarcity of fossil fuels	40	69.1	19.9	**30**	65.4	17.6	-3.7	-2.3	4.3
19	Vulnerability	**30**	62.5	22.3	**30**	67.1	21.3	4.6	-1	3.6
20	Capacity constraints	50	62.8	25.2	40	87.1	24.4	24.3	-0.8	4.3
21	Liberalization and deregulation	40	60.1	21.1	35	63.21	18.8	3.11	-2.4	3.8
22	Virtual communication	**30**	62.4	17.6	**30**	62.3	18.3	-0.1	0.7	3.3
23	Substitution by land transport	40	61.3	22.9	**30**	45.0	20.7	-16.3	-2.2	3.2

24	Smaller long-haul aircraft	47.5	62.4	23.3	47.5	75	23.3	12.6	0	3.6
25	Satellite-based ATC	40	57.5	19.9	**30**	59.3	19.3	1.8	-0.6	4.0

Table 2: Delphi statistics

A hierarchical cluster analysis was conducted in order to identify structures and similarities in the Delphi data.

The visualization of the clustered Delphi results in a strategic future map in the form of a scatterplot allows a logical clustering of the aviation projections examined. Each number represents the corresponding projection listed in table 2.

Figure 6 provides interesting insights. It can be observed that most of the projections have an average impact of 3 or higher, as well as an average estimated probability of 50% or more. In general, this demonstrates the relevance of the projections developed in the first phase within the research project. The results indicate that the a priori formulation and selection of projections have accurately taken place (von der Gracht, Darkow, 2010). Projections where consensus was achieved predominantly exhibit a probability of 60%. This finding is rather common in Delphi studies (see e.g. Ogden et al., 2005) because dissent is more likely to be associated with projections for which the future development is difficult to assess.

In addition, the strategic future map allows for strategic grading of projection clusters comparable to a portfolio analysis. The strategic clusters conglomerate various projections according to their characteristics. Therefore, the projections in a cluster are quite similar. As a consequence, the strategies used to deal with these projections have also to be similar. Using the “estimated probability” and “industry impact” dimensions, three clusters of particular strategic importance were indentified: High-impact expectations scenario, eventualities and potential surprises.

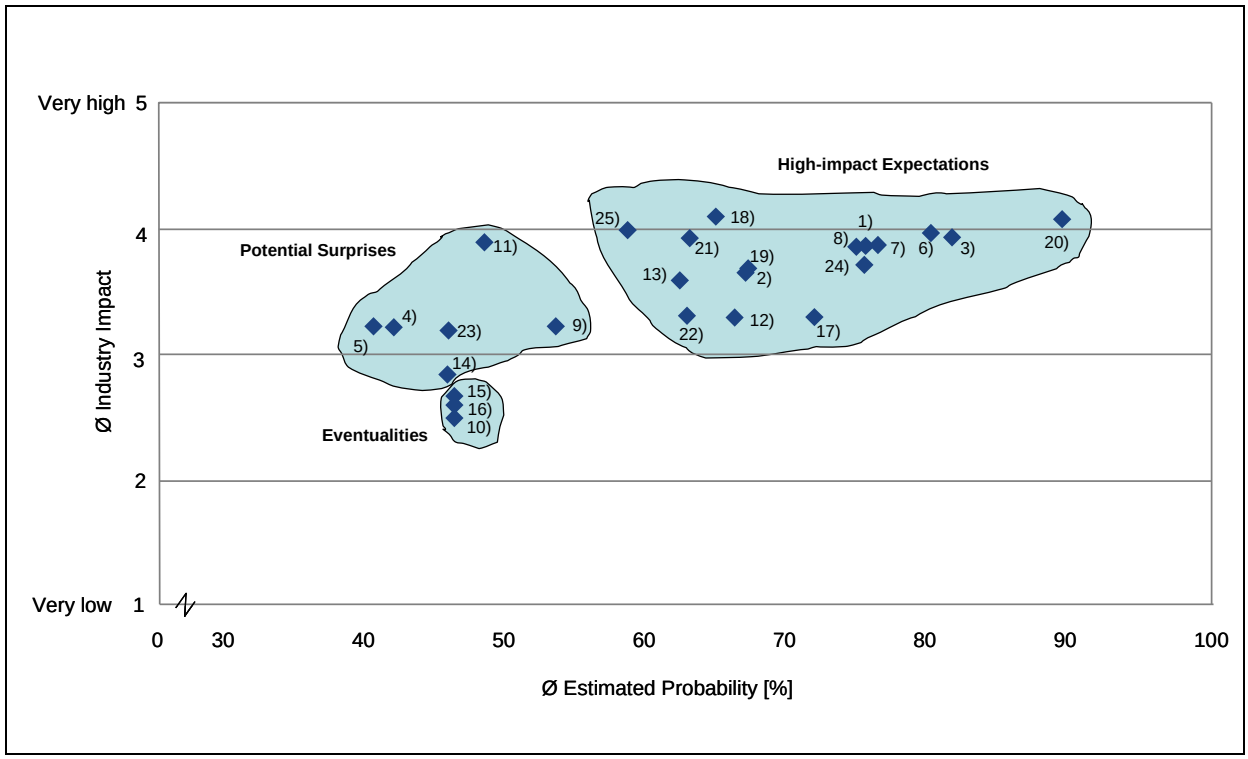

Figure 6: Strategic future map

Source: Own illustration.

6.1 High-impact expectations on the future of Business Aviation 2025

High-impact expectations are characterized by high estimated probability of occurrence and high industry impact. They are, therefore, of great strategic relevance and should be focused on in long-term strategic planning. However, strategists should bear in mind that expectations may turn into potential surprises if they do not occur. Thus, their non-occurrence should also be considered in discontinuity analyses. According to the Business Aviation experts the following high-impact expectations could be derived:

The Business Aviation experts expect that Business Aviation customers will demand “easy” air transportation without wasting time in 2025 (projection 1) and predominantly rely on integrated services (door-to-door, one-stop-shopping) (projections 3). Due to reduced travel budgets, low-cost carriers are also increasingly used for business travel, especially for short distances (projection 2).

Transportation to, from, and within emerging countries (especially Latin America, Russia, India, China and the Near East) are expected to be the major drivers of Business Aviation growth (projection 6) resulting in a outperformance of long-haul national and international business flights in comparison to short-haul international, national and regional business

flights (projection 7). Especially low-cost carriers are considered to grow faster than Business Aviation providers in short-haul markets (projection 8). The growth of the Business Aviation industry is in general impeded by capacity constraints (projection 20).

Business and corporate jets are expected to be managed collectively in pools and fractional ownership will become common (projection 12). In addition, dedicated Business Aviation airports will evolve (projection 13).

In 2025, legally binding emission rights and trading policies are considered to be well established for air transportation (projection 17). The problems related to the scarcity of fossil fuels are still not expected to be resolved (projection 18). According to the experts, the vulnerability of the aviation industry in general will further increase due to unexpected events such as economic crises, fuel price explosion, war, pandemics, terrorism, volcanic eruptions, etc. (projection 19). The liberalization and deregulation of aviation markets will have further progressed but not be completed in 2025 (projection 21).

According to the expert panel, the use of virtual meetings, telephone conferences, and video conferences will tremendously increased (projection 22). In addition, new smaller aircraft for long-haul, transatlantic, point-to-point business flights will be available for Business Aviation in 2025 (projection 24). The experts additionally expect an international (satellite-based) air traffic control system to be in place within the next 15 years (projection 25).

6.2 Eventualities

In this paper, eventualities refer to projections that are characterized by moderate estimated probability. In contrast to potential surprises, these projections are considered possible, but not very likely. Eventualities are usually subject to dispute. They represent the highest degree of uncertainty and are neither believed to be probable nor very improbable. Nevertheless, planners should pay particular attention to eventualities in strategic planning.

Three of the projections considered in this Business Aviation futures study fall into the eventualities cluster: Over the next few years, these projections could become expectations and therefore key variables in strategy development. At the moment, it is unclear whether medical air transportation in chartered business jets will grow rapidly (projection 15), whether business jets will be increasingly utilized for emergency freight transportation (projection 16) and whether Business Aviation will increasingly provide access to remote areas like free trade zones and export processing zones (projection 10).

6.3 Potential Surprises

Potential surprises are characterized by a relatively low estimated probability and average to high impact. Due to their relatively low probability, they are often neglected in strategic planning. However, if they do occur, they have a high impact on the industry or individual companies. It is, therefore, necessary to consider such developments when developing robust strategies.

In this study, six future projections have been identified as potential surprises for the Business Aviation industry that might affect the industry significantly: The experts would be astonished if the use of Business Aviation would be accepted by society (projection 4) and the demand for Business Aviation would exceed the projected annual growth rate for general air transportation in 2025 (projection 9). The industry experts would additionally be shocked if in the future Business Aviation benefits would in the future be less valued in short-haul markets than in long-haul markets (projection 5) and if substitution by land transport (projection 23) or very light jets (VLJs) and air taxi services (projection 14) in short-haul markets would occur in a significant manner. It is additionally not foreseen that the members of the Business Aviation transport chain (airlines, airports, ATC, etc.) will increasingly have to collaborate in system partnerships (projection 11).

7 Conclusions

The strategic analysis of the European Business Aviation market has shown that the external environment this market is embedded in is currently undergoing major changes. The market is highly dependent on and correlated with the regional and global economic development. Economic prosperity attracts new market entries, but an economic crisis reduces the purchasing power of individual and commercial clients and consequently leads to a prompt decline in demand of Business Aviation services and an increase in demand of substitutes, which puts operators under severe pressure and reduces the likeliness of new competitors entering this market. The supply side of the Business Aviation market is highly fragmented and many small operators maintain strong ties to their local customer base.

The future outlook for the Business Aviation industry in the year 2025 looks promising but reveals some challenges that have to be addressed now. According to the experts' estimations, the Business Aviation players will continuously have to provide competitive convenient and efficient door-to-door services in order to prevent a potential substitution by virtual means of

communication as well as air taxi services and low-cost carriers in the short-haul markets. In addition, especially the European Business Aviation industry has to be aware of the rising importance of the emerging and long-haul markets as they are expected to remain the predominant growth drivers until 2025. In this context, the continuous liberalization and deregulation of aviation markets, especially in the emerging countries, will provide new market and growth potentials. Some Business Aviation players may furthermore find growth opportunities in niche markets and services, e.g. the provision of services to remote areas and medical or emergency freight transportation. In addition, the Business Aviation providers will be confronted with an increasing fossil fuel scarcity and the establishment of a legally binding European and potentially an international emissions trading system. In general, the Business Aviation industry is expected to become more vulnerable to singular wildcard events and surprises so that an appropriate risk management as well as a planning in alternative scenarios and contingency planning is demanded.

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