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## **PRODUCT ANALYSIS OF BUSINESS AVIATION COMPANIES: A TWO-DIMENSIONAL APPROACH**

**Summary.** The traditional and current approach to business models in business aviation is based only on aircraft ownership and does not describe the business aviation segment of civil aviation sufficiently. In this paper, we apply a two-dimensional approach analysing the product of companies competing in the business aviation segment of civil aviation. Our analysis combines two product-related components: fleet attributes and portfolio of services to confirm a diversity of business aviation companies and their business models. Using data of thirty business aviation companies from world regions, we reveal a diversity of business models in business aviation that is contradicting with a traditional approach to business models in business aviation.

### **1. INTRODUCTION**

Business aviation is a growing segment of aviation with specific features. As a subset of general aviation (GA), business aviation is commonly defined as the use of general aviation aircraft for business purposes. General aviation, which encompasses all civil aviation activities except that of the commercial airlines, is an integral and vital part of the world's transportation system. Business aircraft include helicopters, piston-powered propeller-driven airplanes and turbine-powered turboprops and turbojets [1]. Business aviation offers air services for both corporate and leisure customers that are strongly inelastic to price and highly elastic to time and that demand individualized air services of luxury quality. Business aviation differs against other segments of civil aviation in which scheduled carriers (traditional, low cost and hybridized) or unscheduled carriers (holiday ones) deliver their mass product. Core business aviation product (air service) is based on four interrelated pillars – space flexibility, time flexibility, comfort and distinctness. From the point of view of economic theory, the product of business aviation is characterized by excludability. Once bought by a customer (one person or a group of persons), the others are excludable from the consumption. The product of scheduled airlines is predetermined in space and time by flights schedules decided by carriers in advance; comfort attributes are decided by the carriers in advance too and – respecting capacity limits – anybody can buy the product and consume it together with the others who bought it. If there is a free capacity on a flight, nobody is allowed to be excludable from consumption. The product of holiday carriers is delivered to consumers as a part of a complex holiday parcel and as in the case of scheduled carriers, nobody is allowed to be excluded from consumption. Excludability of a business aviation product as well as other features that are decided by consumers themselves in advance confer business aviation product attributes of „on demand“ product [2, 3]. By offered products and services, airlines competing to gain market position [4].

Although products of carriers operating in other segments of civil aviation have been analysed many times in numerous academic papers and research studies aimed at business models of

commercial airlines, the business aviation product still needs to be analysed more. We believe that product attributes are important to understand business models of carriers in business aviation.

In this paper, we analyse thirty business aviation companies from world regions (North America, Asia, Middle East and Europe) focusing on fleet attributes as the basic asset of an airline and the portfolio of services supplied. The analysed data were obtained from www pages of the companies and this limited the scope of the analysis. As both attributes influence an overall product (value) delivered to consumers, our analysis can also be considered a contribution towards the research of business models in business aviation.

## 2. PREVIOUS RESEARCH

According to our consideration, the research of business aviation is not covered sufficiently by the scientific literature. Liberalization and business aviation [5], business aviation markets in countries and its role in the economies [6, 7], general social and economic impacts of business aviation [2, 3], determinants for the development of business aviation and business aviation aircraft acquisition [8], are the main economic issues discussed currently. The value of business travel is analysed in [9], thus covering an important aspect of the business aviation product.

Resulting from summarization of research aimed at business models in the air industry [10], the research gap in the field was identified because current economic research of business models in business aviation is underdeveloped, relying on a traditional approach consisting of three business models – a model of ad hoc charters, a model of fractionized ownership and a model of corporate jets [2 and 3]. All the models are derived from an ownership of business aircraft not considering other relevant aspects of any business models such as product features (portfolio of services, processes), fleet attributes, horizontal cooperation with scheduled airlines, horizontal cooperation with other airlines, frequent flyer (loyalty) schemes, investment out of the industry, participation in business aviation associations, cooperation with (regional or dedicated) airports, acquisitions of other business aviation companies, mergers with other business aviation companies, creating of subsidiaries, etc. [10].

The term “business model” was rarely used in the 1990s. Since 2000, we can observe a sharp increase of its usage [11]. From the latest scientific literature, Wirtz et al. describe the development of the general business model, its components and the possibilities for future research [11]. DaSilva and Trkman describe historical development stages of the term “business model” [12]. Souto defines the importance of business model innovation for business success in the hotel business [13]. Benson-Rea et al. create a typology of business models in the wine sector [14].

In the air transport sector, Pereira and Caetano create the concept of the business model applicable to air transport [15]. Daft and Albers analyse the convergence of airline business models [16]. Heinz and O'Connell analyse African airlines [17]. However, none of these researches analyse the business aviation airlines. Researchers focus mostly on scheduled airlines (or charter and cargo airlines). Signs of two basic business models of scheduled airline (traditional and low-cost business model) are defined in detail in numerous studies. Recent studies have already addressed hybridization of basic two business models [for example 18, 19 and 20].

In comparison with business models of scheduled airlines (but also business models in different business sectors beyond aviation) that are the subject of many research studies, business models in the business aviation have received very little attention. Pereira and Caetano consider the dichotomy of business models for traditional and low-cost business models no longer sufficient for today's market [15]. In line with conventional definitions of business models in general, core assets and product attributes, i.e. aircraft and product portfolio are starting points to analyse business models in business aviation. Moreover, the role of core assets (aircraft) is extremely important for many product characteristics (comfort on board, time of flight, geography of flights (flight range), etc. and for this reason, both fleet and portfolio of services are relevant to analyse the product delivered by business aviation companies to customers.

### 3. RESEARCH AIM AND RESEARCH METHODOLOGY

Based on the research gap explained previously, in this paper, we aimed to analyse the product of selected business aviation companies in world regions using two dimensions: fleet attributes as the basic asset of an airline and a significant feature of airline business model and the range of services supplied by the companies and consequently to verify the idea of diversified business models in business aviation<sup>1</sup>.

The companies were chosen according to the availability of necessary data and randomly since there is no complex database of business aviation airlines. We used publicly accessed data and this strongly limited us in our research as many business aviation companies do not offer sufficient information in this way. Companies with various years of establishment were included in our analysis starting from Abelag established in 1964 to Executive Airlines established in 2010. The data used are as of September 2015.

The first dimension of our analysis – a range of services – was compiled using the information of the processed companies at the www pages. Thus, we identified eighteen possible services from the analysed companies, which are summarized in Table 1 below and which we compared among companies.

Table 1

The list of covered services

Charter flights	Training of stewards
Charter frequent flyer programmes	Training of pilots
Empty legs flights	Consultancy
Fractional ownerships	Fixed base operator
Aircraft leasing	Aircraft maintenance
Aircraft sale	Rescue flights
Aircraft administration and management	Flights for films and other flights (surface photos, etc.)
Aircraft detailing	Adventure parcel flights
Aircraft completion	Sub-marks (hotels, coffee houses, etc.)

As the source of the second dimension of analysis – a fleet – we used the www pages of companies too. For each aircraft in airlines' fleet, we collected data on its capacity (in passenger numbers) and its range (in km). Subsequently, we computed for each company the following aspects of fleet: the fleet size (as total number of aircraft in fleet), the commonality of fleet (expressed through the Herfindahl–Hirschmann index) and the total fleet capacity (in passenger numbers).

The Herfindahl–Hirschmann index (HHI) is a frequently used index for measuring the commonality or the diversity of a fleet. HHI works with the total number of aircraft in a fleet and the share of the particular aircraft type in relation to the entire fleet in line with the following formula:

$$HHI = \sum_{i=1}^n s_i^2 \quad (1)$$

where  $s_i$  – share of one aircraft type in relation to the total number of aircraft in the fleet;  $n$  – total number of aircraft in the fleet.

<sup>1</sup> It would be interesting to include the analysis of prices for services of particular business aviation companies (or at least prices of charter flights as this service is offered by all companies). However, we were strongly limited by the data access. Prices of business aviation companies are not publicly reported as prices of schedule airlines are. Prices of business aviation companies depend on many factors and on precise requirements of customers (destination, type of aircraft used, number of passengers, trip length, in-flight services, service before and after flight, price discrimination to loyal customers, etc.) and they are calculated individually. From the 30 analysed companies, only 2 (Clay Lacy and Meridian Air Charter) have approximate hourly rates according to the aircraft type (large jet, mid-size jet, super mid-size jet and large jet) on their websites.

HHI values ranges from 0 to 1, where values close to 1 indicate a homogenous fleet (consisting of one type of aircraft) and values close to 0 indicate a heterogeneous fleet (consisting of many types of aircraft).

Then, we compared the number of supplied services against the following:

- overall capacity in seats
- size of the fleet
- commonality of the fleet expressed through HHI

Subsequently, we analysed the size of the fleet, the age of the companies and the range of supplied services. Finally, we constructed a two-dimensional grid revealing four groups of the business aviation companies based on the fleet size and the portfolio of services.

#### 4. RESULTS

As shown in Fig. 1, Clay Lacy Company from the US and European TAG Aviation offer most of the analysed services (10 and 9, respectively). 23% of the companies offer only four of the eighteen analysed services; however, the structure of the services offered is different on comparing the companies with each other. Companies from Asia included in our analysis recorded a smaller number of analysed services in comparison with companies in North America and Europe. Three Asian business aviation companies offer only 3 from 18 analysed services. But also in Europe and in North America, we found business aviation companies offering a smaller number of services (for example Martin Air with 3 services and CAT Aviation with 4 services).

As the number and structure of analysed services differ for the companies, it indicates the different approaches of the companies to business aviation markets and customer segments in business aviation.

All companies offer charter flights; however, only 40% of them offer a frequent flyer (loyalty) charter programme (but no company in Asia offers a frequent flyer programme). Fractional ownership is offered by 10% of the analysed companies; but again not by companies in Asia. Management and administration of aircraft, aircraft maintenance and FBO were also very frequent in the companies (90%; 77%; and 47%, respectively). We consider these services as the core services in business aviation, whereas others (adventure parcels with flight, aircraft detailing, aircraft completion, etc.) can be interpreted as product innovations.

Our analysis showed that there is a relationship between capacity in seats and the number of aircraft in the fleet of companies. The relationships are demonstrated in Figs. 2 and 3. The greater capacity offered and the higher number of aircraft in the fleet indicate a broader portfolio of services, although there can be a deviation from the trend confirming the singleness of business models in business aviation.

Adding the age of the companies to our analysis (besides fleet size and number of services) did not confirm the relationship among age, fleet size and number of services. For instance, Clay Lacy is an old company offering a large portfolio of services; however, the fleet of Clay Lacy is not the largest. Landmark Aviation is also an old company with the largest fleet in the sample; however, it offers only five services. Priester Aviation and Meridian Air Charter are also among old companies, but they have a smaller fleet and a smaller portfolio of services. TAG Aviation is a relatively new company with the largest fleet among the European companies analysed and a high number of services. This conclusion needs to be verified using a larger number of companies.

Finally, we grouped the companies using a two-dimensional analysis covering fleet size and number of services as shown in Table 2. Thus, we did not consider the age of the company, the capacity offered and the commonality of the fleet. Using the above-mentioned results, the only capacity in seats was revealed as explanatory for the number of services; however, taking into account the distinctness of air service delivered to the customer, we did not work with it further as one customer can buy full capacity of aircraft. Using this approach, we distinctly identified four cells based on a combination of fleet size and number of services.

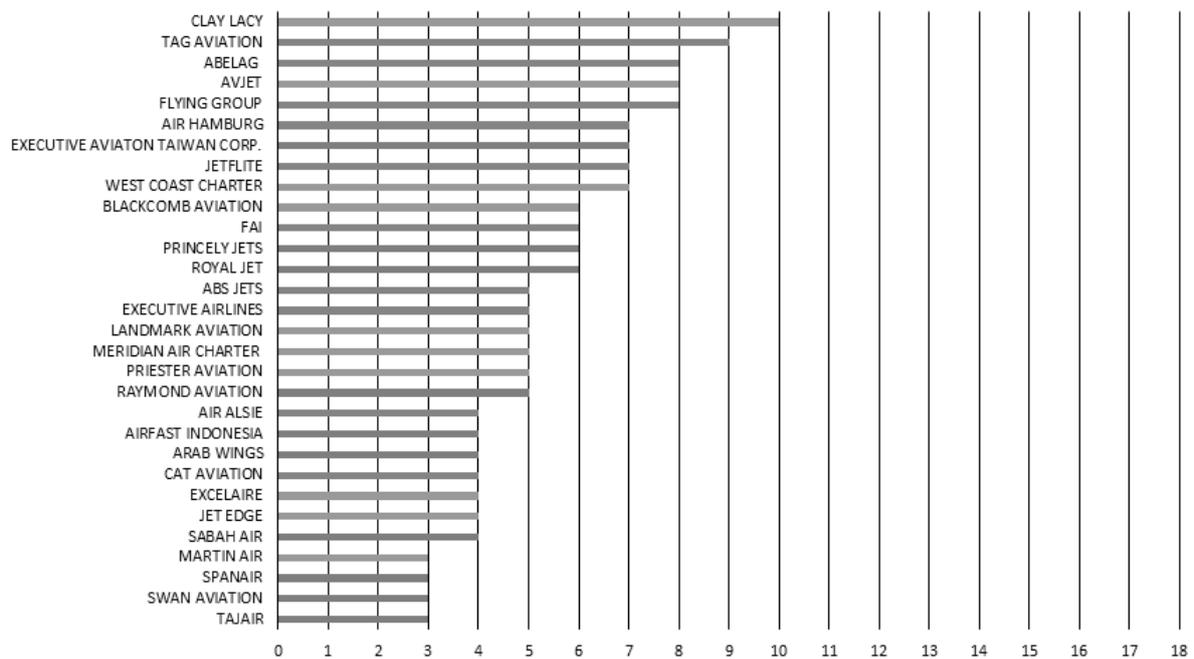


Fig. 1. Number of analysed services offered by companies<sup>2</sup>

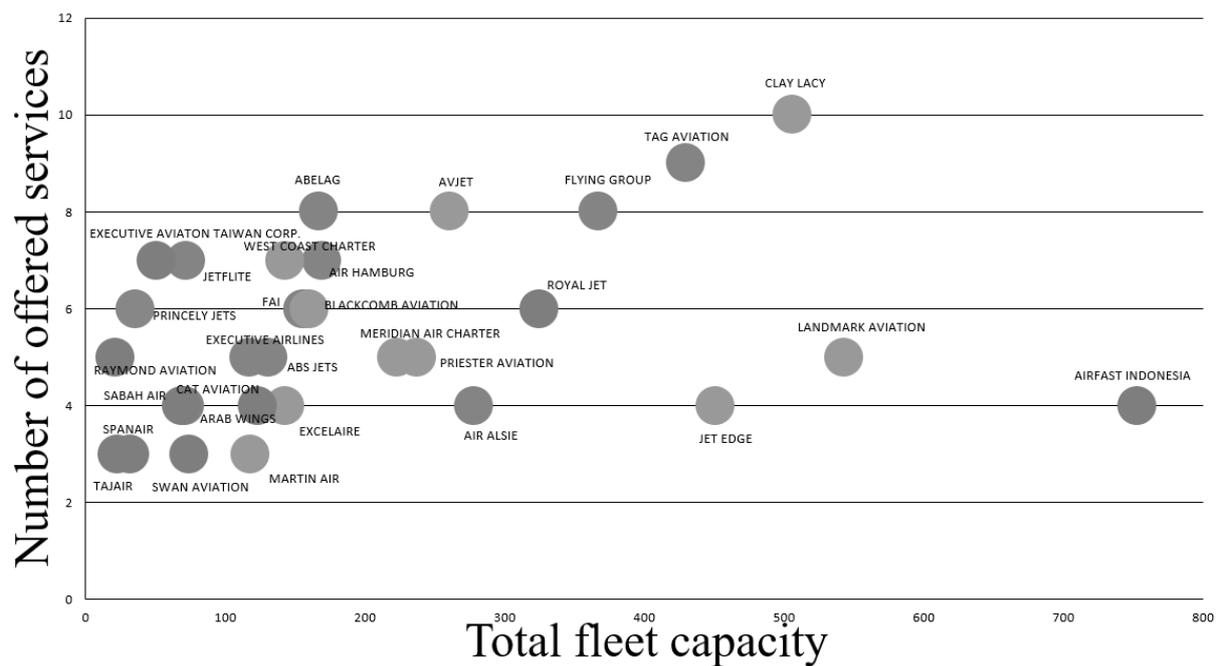


Fig. 2. Number of analysed services and capacity offered

<sup>2</sup> Three colours are used in the figures to distinguish Asia, Europe and North America (blue – North America, green – Europe, orange – Asia).

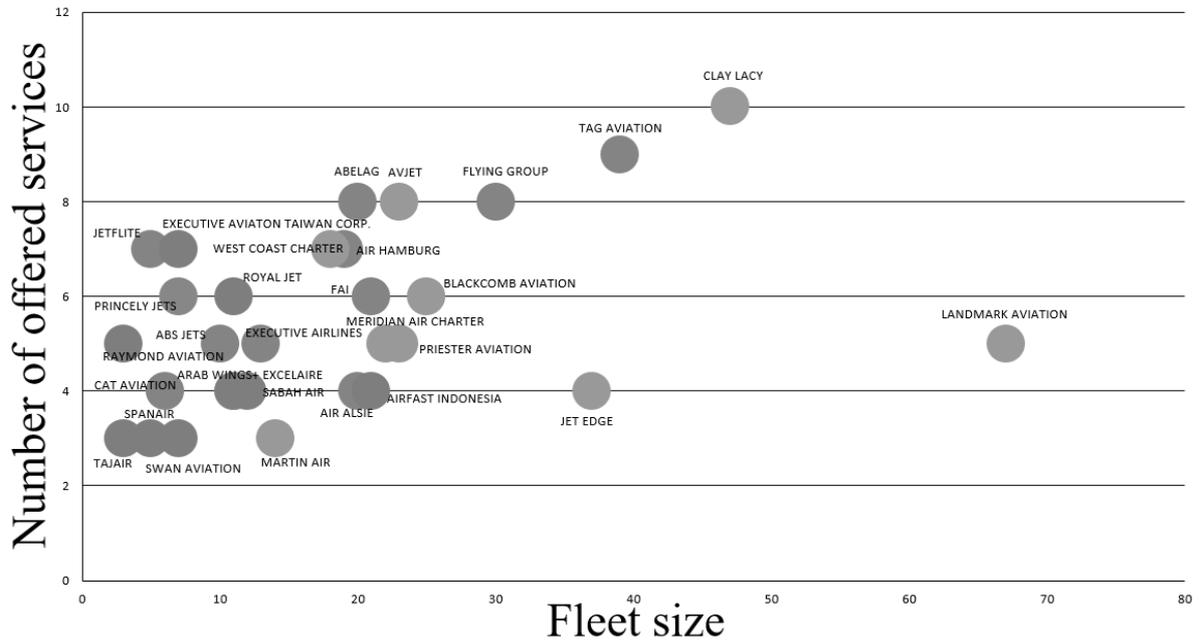


Fig. 3. Number of analysed services and size of fleet

Our analysis did not reveal the role of the fleet commonality expressed through the HHI index with respect to a range of services offered by companies in business aviation as shown in Fig. 4.

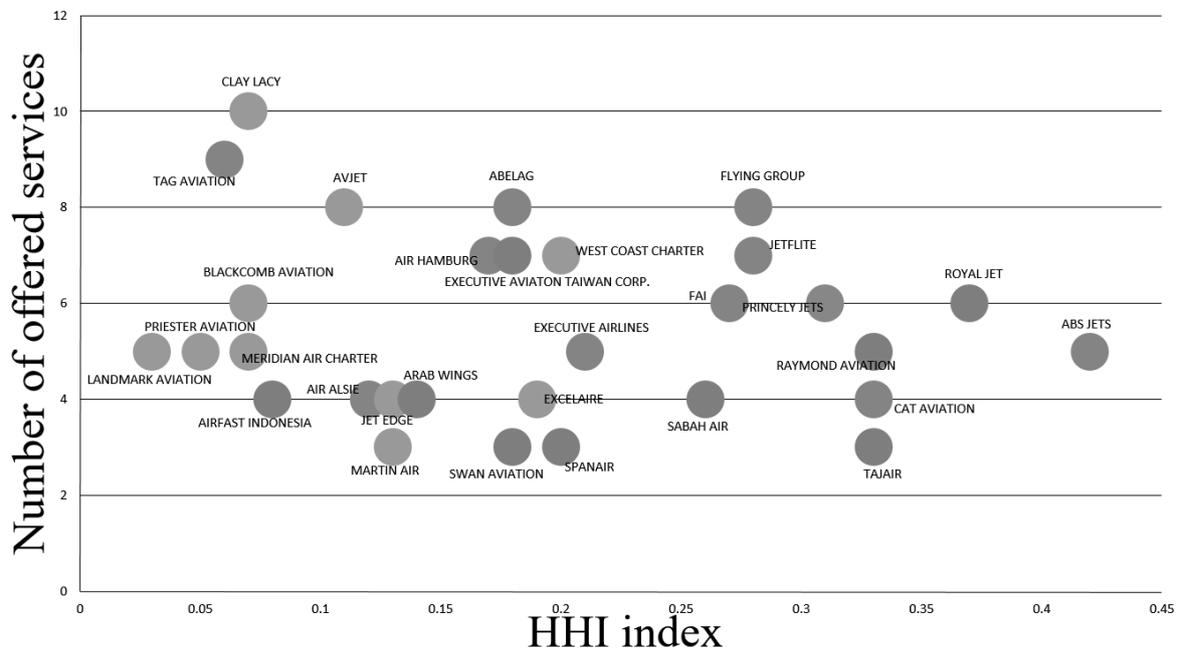


Fig. 4. Number of analysed services and commonality of fleet

Table 2

Two-dimensional typology of selected business aviation companies based on product analysis

	<b>Number of services less than 5</b>	<b>Number of services more than five</b>
<b>Number of aircraft more than 33</b>	JET EDGE LANDMARK AVIATION  <b>large fleet–small portfolio of services (L/S)</b>	TAG AVIATION CLAY LACY  <b>large fleet–large portfolio of services (L/L)</b>
<b>Number of aircraft less than 33</b>	ABS JETS AIR ALSIE CAT AVIATION EXECUTIVE AIRLINES EXCELAIRE MARTIN AIR MERIDIAN AIR CHARTER PRIESTER AVIATION AIRFAST INDONESIA ARAB WINGS RAYMOND AVIATION SABAH AIR SPANAIR SWAN AVIATION TAJAIR  <b>small fleet –small portfolio of services (S/S)</b>	ABELAG AIR HAMBURG FAI FLYING GROUP JETLIFE AVJET BLACKCOMB AVIATION WEST COAT CHARTER EXECUTIVE AVIATION TAIWAN CORP. PRINCELY JETS ROYAL JET  <b>small fleet –large portfolio of services (S/L)</b>

The companies with a small fleet (less than 33 aircraft) offering a narrow range of services (less than five) represented the most common concept of making the business by business aviation companies included in our analysis. A combination of a small fleet size with a higher number of services was found to be relatively frequent among the companies in the researched sample. Marginally, in the business aviation segment, companies with a large fleet (more than 33) also operate by offering a smaller number of services as well as companies with a large fleet offering a considerable number of services.

In general, the results support an idea of distinct and diversified business models in business aviation.

## 5. CONCLUSION

This analysis based on thirty companies from world regions shows different approaches to product architecture undermined by fleet attributes and portfolio of services supplied on markets. As product architecture is mentioned in every definition of the business model, it is a natural starting point when

analysing business models. According to our knowledge, a comprehensive product analysis of business aviation companies has ignored in the scientific literature. In Table 2, we show the diversity of business aviation; therefore, we consider the traditional approach to business models in business aviation as outdated and not reflecting the current situation and the significant features of a business model. But a suitably chosen business model influences the success of the company.

Based on the findings, we support in this way business models in business aviation as a very perspective topic for future research. Deeper knowledge of business models in business aviation is needed to describe the business aviation segment in line with the evolution that is taking place. The current approach to the topic is not satisfactory with respect to the expected growth of business aviation and its higher dynamics in comparison with other segments of civil aviation.

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