Journal of Air Transport Management 54 (2016) 80–87

Contents lists available at ScienceDirect

Journal of Air Transport Management

journal homepage: www.elsevier.com/locate/jairtraman

Are commercial revenues important to today's European air navigation service providers?☆

Anna Tomová

Faculty of Operation and Economics of Transport and Communications, University of Žilina, Univerzitná 1, 010 26 Žilina, Slovak Republic

ARTICLE INFO

Article history:
Received 21 October 2015
Received in revised form
15 February 2016
Accepted 28 March 2016

Keywords:
Air navigation service providers
Business model
Commercial revenues
Commercialisation
Corporatisation
Competition

ABSTRACT

In this paper we discuss the role of commercial revenues in the economics of European air navigation service providers (ANSPs) starting with the legal definitions of commercial revenues as contained in the respective European Union legislation. Based on the investigation of European ANSPs annual reports and/or strategic documents, we define the attributes of a new commercial model in the provision of air navigation services (ANS). We provide evidence that several European ANSPs have already implemented all or a majority of the attributes typical for the new commercial model. Discussing demand-side and supply-side drivers which could spur or impede the commercial business of European ANSPs, we assume the commercialisation of European ANSPs will be reinforced in future. Therefore, we design a set of partial indicators which enable us to analyse the role of commercial revenues in the economics of ANSPs.

1. Introduction

While commercial revenues of airports have been studied in several papers - Graham (2009), Tovar and Martín-Cejas (2009), Castillo-Manzano (2010), Kratzsch and Sieg (2011), Fuerst et al. (2011), Lin and Chen (2013), Olariaga (2015) - commercial revenues of air navigation service providers (ANSPs) are ignored by current aviation research. Commercial revenues of ANSPs are not mentioned in CANSO (2014) Global Air Navigation Services Performance Report at all and although Eurocontrol (2015) ATM Cost-Efficiency 2013 Benchmarking Report contains information about so called other revenues of ANSPs (and the other revenue components as well), it does not provide any deeper analysis of commercial revenues. Papers devoted to the benchmarking of European ANSPs written by Mouchart and Simar (2003), Button and Neiva (2014), Bilotkach et al. (2015) did not use revenues (including commercial ones) as an output, thus leaving the revenue side of the ANSPs business untouched. Only Arnaldo et al. (2014) included income from charges and other revenues as outputs in the benchmarking of ANSPs. However, they were not interested more in the role of commercial revenues in the ANSPs performance.

There are several reasons why commercial revenues of ANSPs are not present as an issue in current aviation research. In the past, ANSPs were managed and operated as public utility entities - monopolists on geographical markets copying state borders. As public utility entities, they were focused on the delivery of air navigation services (ANS) in the public, and not commercial, interest. The processes of corporatisation and commercialisation of ANSPs started later in comparison with airports, and privatisation of ANSPs is still rare all over the world. That is why corporatisation, commercialisation and privatisation of ANSPs could not boost commercial revenues at the level recorded for the majority of corporatised, commercialised and privatised airports. Moreover, ANS have a specific nature if we compare them with airport services. While airport activities and airport aeronautical services (or at least some of them) are directly connected to passengers, ANS are predominantly delivered to airspace users. This does not enable ANSPs to exploit the potential of passengers to generate revenues of a commercial nature. However, on the other hand ANS can be (at least potentially) delivered to other ANSPs or other subjects on a commercial basis, if national regulation allows it and such demand exits. The commercial potential of ANS relates not only to core ANS (such as terminal control services within Air Traffic Management - ATM), but also to support ANS services (Communication, Navigation and Surveillance – CNS; Meteorological Services for Air Navigation – MES; Aeronautical Information Services – AIS; Search and

☆ When creating the title we were inspired by Graham (2009) paper: How important are commercial revenues to today's airports?.

E-mail address: anna.tomova@fpedas.uniza.sk.

http://dx.doi.org/10.1016/j.jairtraman.2016.03.023
0969-6997/

Rescue – SAR) and to supplementary services (training, consultations, projects, publications etc.) as well.

A new situational context in which ANSPs run their business at present - competition of some ANSPs on the market for en-route services in fragmented world regions, deregulation of terminal control services in some countries, pressure on the ANSPs cost efficiency from air carriers driven by sharpening competition among them, capital intensity of the ANS production driven by new technologies, deficits in public budgets, etc. (Tomová, 2015) – encourage ANSPs to conduct their business in a more commercial way. In the European Union, where, under the common European performance scheme and common charging system, the potential profit of ANSPs is regulated, the issue of commercial revenues acquires attention as a regulatory problem[1] - and in the long-term perspective - as a structural problem taking into account more radical structural changes towards more liberalisation, as projected by the European Commission.

In this paper we discuss the role of commercial revenues in the economics of European ANSPs starting with legal definitions of the term contained in the respective EU common charging regulations. To provide evidence of commercial business, we investigated annual reports and strategy documents of European ANSPs, focusing particularly on how European ANSPs declare themselves with regard to commercial activities. We define a new commercial business model of ANSPs, listing its attributes, and design several indicators which could help to analyse the commercial side of ANSPs business. A new approach to the product portfolio of ANSPs is explained here in this context. We discuss which factors could spur or impede the generation of commercial revenues in the business of European ANSPs in future. And finally, we project the rails for further research.

2. Funding of ANS in the European Union by commercial revenues

In general, there are two main models of ANS funding – direct funding from user charges and indirect funding from governmental budgets or specific governmental funds. Actually, the majority of ANSPs in the world are financed by several means, using a combination of direct user charges and indirectly generated sources.[2] In the European Union, revenues generated by direct user charges for air navigation services (en route charges and terminal ones levied on airspace users) are principal sources of the ANSPs funding, which is fully in line with the ICAO's recommendations contained in Doc 9082 ICAO's Policies for Airport Charges and Charges for Air Navigation Services (ICAO, 2009). Between 2007 and 2011, the Commission Regulation (EC) No 1794/2006, laying down a common charging system for ANS, required the costs of en route services to be financed by means of en route charges imposed on the users of ANS and the costs of terminal services to be financed by means of terminal charges imposed on the users of air navigation services and/or other revenues, including cross-subsidies in accordance with Community law. The nature and components of other revenues were not defined by the regulation at all although, according to the regulation, member states were required to describe the income from other sources when they existed.

Between 2012 and 2014, i.e. in the first reference period, the common charging system in the European Union was interrelated with the common performance scheme for ANS. In this period, the Commission Regulation (EU) No 1191/2010 amending the Commission Regulation (EC) No 1794/2006 defined other revenues as revenues obtained from public authorities or revenues obtained from commercial activities and/or, in the case of terminal unit rates, revenues obtained from contracts or agreements between air navigation service providers and airport operators, that benefit air navigation service providers with regard to the level of unit rates. Thus, the term revenues obtained from commercial activities (i.e. commercial revenues) was used for the first time in the respective EU common charging regulation. The regulation also required a description of revenues from other sources when they existed. Contrary to the previous regulation, the new rules enabled the funding of the determined costs of en route ANS by en route charges imposed on airspace users and/or other revenues. The determined costs of terminal ANS could be financed by terminal user charges and/or other revenues, keeping an option for cross-subsidies granted in accordance with Union law as set in the previous regulation. Under the common performance scheme in the first reference period, the cost efficiency of en route services started to be regulated as a key performance indicator at European and local level.

Starting from 2015, i.e. from the second reference period, the Implementing Regulation (EU) 391/2013 defined other revenue as revenues obtained from public authorities, including financial support from Union assistance programmes such as the Trans-European transport network (TEN-T), the Connecting Europe Facility (CEF) and the Cohesion Fund, revenues obtained from commercial activities and/or, in the case of terminal unit rates, revenues obtained from contracts or agreements between air navigation service providers and airport operators. As in the previous regulation, a description of other revenues, was required, however, broken down according to the above-mentioned categories. The prescribed unit rate calculation tables for the second reference period distinguished the revenues from Union assistance programmes, national public funds, revenues from commercial activities and the rest called other/other revenues as components of the total other revenues. For the first time, the respective reporting table for calculation of unit rates required to mention separately the value of revenues from commercial activities. This at least indicates an increasing role of commercial revenues in the ANSPs funding. During the second reference period, the cost efficiency key performance indicators have been designed to cover both the cost efficiency of en route ANS and the cost efficiency of terminal ANS (the cost efficiency target for the terminal portion is expected to be announced in the middle of the second reference period).

Why was it so important to make definitions and rules for commercial revenues in the EU charging regulations more precise? Unclear definitions and rules with regard to commercial revenues could lead to ambiguities and any such ambiguity could cause at least misunderstanding at the ANSPs level. Moreover, national strategic gaming under unclear definitions and rules could be supported in this way. If other revenues (and commercial ones too) are deducted when setting the level of cost basis then unit rates (prices) decrease – ceteris paribus. This approach to pricing is known as single till in aviation infrastructure economics. This means that profits generated by commercial revenues decrease the cost bases necessary for the establishment of prices. For this reason, the calculation of unit rates for ANS in the first and the second reference period contained also calculation of unit rates (both en route and terminal ones) that would be applied without other revenues.

[1] Under specific conditions given by the respective regulations only some parts of the ANSPs economics are not regulated by the European Commission (for instance, costs of CNS, AIS, MET, SAR, if provided under market conditions, are not required to be included in the cost basis which is relevant in setting regulated charges).

[2] The provision of air navigation services in the US is primarily funded through the sources of Airport and Airway Trust Fund (AATF) and sources of general budget as well. Indirect taxes are levied to generate income for AATF. However, only overflights are charged by charges with differentiated unit rates for continental and oceanic airspace. The rates are applied on distance flown (FAA, 2015).

Hypothetically, when some component of other revenue was not defined by the regulation at all, or it was not defined well, an ANSP did not have to take this into account when calculating unit rates if it was for its own benefit. This strategic game could have many reasons. For instance, unwillingness to be more cost-efficient could lead to a situation when such components of other revenues not covered by the respective regulation, or defined insufficiently, did not have to be deducted in the calculation of cost basis, ensuring in this way – all else being equal – sufficient revenue streams from direct user charges through higher prices. Profit maximisation could be another motive of such ANSPs (and member states) behaviour.

Summarizing, the respective EU regulations on the common charging system have gradually reflected more commercial revenues as an important attribute of the ANSPs economics.

As has been already stressed, the Eurocontrol approach to the benchmarking of European ANSPs does not devote any attention to commercial revenues per se. In the respective tables which contain the data on the total ANS revenues, commercial revenues are not explicitly mentioned. Eurocontrol uses the breakdown of the total ANS revenues on income from charges; income for airport operator; income received from the military; income received from other states for delegation of ANS; income in respect of exempted flights; other income from domestic governments; exceptional income item; financial income and other income. Therefore, we can only assume that commercial revenues (in the sense of revenues generated by commercial business of ANSPs) are hidden in the values of other revenues and/or financial revenues.[3]

In Table 1, there are only 8 European ANSPs which recorded no other revenues and simultaneously financial revenues in both the analysed years. On the other hand, the Big Cinque of European ANSPs recorded interesting values of other revenues and financial revenues in 2013. If we add the 2013 values of other revenues to the values of financial revenues, then the respective sums for the Big Cinque were between the values € 5.815 million (NATS) and € 21.561 million (AENA) although the share of other revenues and financial revenues added together and counted against the revenues from charges was still rather low (0.72% for DSNA, 0.80% for NATS, 2.71% for ENAV, 3.06% for AENA and 5.33% for DFS). The only DSNA within the Big Cinque slightly decreased other revenues between 2010 and 2013 while the rest of ANSPs (DFS, AENA, NATS and ENAV) increased other revenues and/or financial revenues in the period significantly.

3. Emerging commercial business of European ANSPs (?)

In Europe, as in the rest of world, the provision of ANS was not managed as a business for a long period. Providers of ANS were perceived as aviation infrastructure entities incorporated within governments. They were operationally oriented and did not dispose of sufficient managerial autonomy to conduct any other commercial business. Therefore, at that time, ANSPs were only passive providers of ANS without any focus on commercial activities. In the management of core ANS represented by ATM, as well as support ANS represented by CNS, AIS, MES and SAR a commercial style of management was not being applied. Continuously, corporatisation and commercialisation of European ANSPs started, and the potential to manage the provision of ANS as a business has started to be exploited. Corporatised European ANSPs tried to find capabilities to develop the commercial portion of their business, thus reacting to the existing demand for the services offered by ANSPs. In this sense, the business of European ANSPs can be split into a regulated and commercial part, as depicted in Fig. 1. Paradoxically, the process of commercialisation was promoted by increasing competition on the market among European ANSPs (in the segment of en route services) and also by increasing the regulatory framework spread over the providers by the European Commission, due to the common performance scheme. The ANSPs were looking for a new business and new commercial opportunities in which they were not locked by a strict European economic regulation under the common performance scheme. Namely, in the regulatory part of business, the EU ANSPs had to conform with strict supranational regulatory rules (cost level, forecasted production in service units, investments, cost of capital etc.) limiting in this way the ANSPs to conduct this part of their business autonomously.

At present, several important European air navigation service providers declare themselves explicitly as commercial business entities seeking new commercial opportunities and new markets for their commercially delivered services (Table 2).

From the Big Cinque of European ANSPs, only the DSNA did not declare interest in running commercial business.[4] As contained in Table 2, also minor ANSPs such as ANS CR stated their intention to conduct their business as a commercial one with a clear declaration of this strategy. In Northern Europe, LFV in Sweden also declared itself in this way. The ANSPs mentioned in Table 2 have different ownership and governance models, which proves that commercial business may be developed both under public and partially private ownerships as well as under different modes of corporatisation – whether state enterprise, state joint stock company etc. Besides the European ANSPs which explicitly declared their business as a commercial one, we revealed the ANSPs in Europe which develop commercial business considerably, although this is not explicitly expressed in their strategic documents and/or reports. They are, for example, Irish IAA, Danish Naviair, Norwegian Avinor which have stakes in Entry Point North (together with LFV) delivering ATC training to the owners and external customers as well. On the other hand, there are European ANSPs which do not mention commercial business in their annual reports at all, such as the ANSPs in Greece, Portugal, Estonia, Lithuania, Estonia, Croatia, Cyprus, Malta, Austria (and DSNA as has been already mentioned). And there are several European ANSPs which even manifest other attitudes like LPS SR, š. p. Slovakia (… '*safe provision of ANS is a long term objective of the company with the highest priority, and it will prevail over commercial, operational, environmental and social interests*' …). Similarly, this attitude was declared by the ANSPs in Slovenia, Finland and Poland. The spectrum of approaches to the commercially-driven strategy complete ambivalent ANSPs fluctuating among commercialisation of the ANSPs business and the traditional way of conducting business, such as HungaroControl in Hungary (… '*the adequate level of safety is given high priority against commercial … aspects … the business strategy to a new kind of competition is focusing on how to make effective use of new capabilities and infrastructure in an environment to be commercialised*' …).

Thus, according to the level of commercial activities, we can roughly distinguish in Europe two groups of ANSPs following two different business models: a traditional one in which commercial

[3] If, for instance, ANSPs establish daughter companies involved in commercial business or they establish joint ventures, then revenues generated by the companies may be recorded as financial revenues from the long-term financial investment. Commercial revenues can also be generated by the operation of ANSPs themselves. Then they are recorded as revenues from the ANSPs operation, however delivered on a commercial (and not regulated) basis. The revenues breakdown used in the Eurocontrol benchmarking reports does not enable us to analyse commercial revenues of ANSPs on a pan European scale.

[4] To elicit the strategy based on commercial business, we must distinguish between declared interest to make commercial business and real activities of commercial nature.

Table 1
Revenue from charges vs other revenues and financial revenues of 36 European ANSPs (2010 and 2013 in €000).

ANSP	Revenues from charges			Other revenues			Financial revenues		
	2010	2013	Change In %	2010	2013	Change In %	2010	2013	Change in %
Aena	**1 012 086**	**705 181**	**−30.32**	**8000**	**18 067**	**+125.83**	**295**	**3494**	**+1084.4**
ANS CR	122 283	124 724	+2.00	0	0	0	360	0	–
ARMATS	7398	8134	+9.95	0	0	0	0	0	0
Austro Control	207 719	208 550	+0.40	0	0	0	701	931	+32.81
Avinor •	92 175	103 731	+12.54	3702	3250	−12.21	0	0	0
Belgocontrol	184 217	175 649	−4.65	8313	12 081	+45.33	1036	139	−86.58
BULATSA	83 578	82 409	−1.40	655	187	−71.45	1268	1482	+17.8
Croatia Control	63 574	72 624	+14.24	0	0	0	0	0	0
DCAG Cyprus	39 508	48 269	+22.18	0	0	0	0	0	0
DFS	**862 033**	**1 023 488**	**+18.73**	**0**	**0**	**0**	**49 745**	**54 512**	**+9.58**
DHMI	361 418	416 531	+15.25	0	0	0	0	0	0
DSNA	**1 283 349**	**1382 098**	**+7.69**	**10 238**	**10 000**	**−2.32**	**0**	**0**	**0**
EANS	13 394	18 130	+35.36	0	0	0	0	0	0
ENAV	**591 943**	**718 335**	**+21.35**	**8837**	**19 453**	**+120.13**	**0**	**0**	**0**
Finavia	44 928	54 532	+21.38	2160	1071		0	0	0
HCAA	181 449	151 536	−16.48	0	0	0	0	0	0
HungaroControl	92 157	104 351	+13.23	0	2438	–	3866	2503	−35.07
IAA	130 224	127 050	−2.44	0	0	0	265	268	+1.13
LFV	146 442	200 059	+36.61	0	0	0	2430	5481	
LGS	21 606	23 988	+11.02	333	310	−6.91	248	6	−97.58
LPS	50 953	62 620	+22.90	1119	998	−10.81	45	96	+113.33
LVNL	213 245	173 614	−18.58	3323	3565	+7.28	54	64	+18.52
MATS	12 060	18 891	56.64	0	0	0	0	0	0
M-NAV	10 702	10 149	−5.17	0	0	0	52	23	−55.77
MoldATSA	8966	12 142	+35.42	0	0	0	5	16	+220.00
NATA Albania (Albcontrol)	18 856	21 146	+12.14	334	237	−29.04	1802	65	−96.40
NATS•	**603 383**	**724 047**	**+20.00**	**0**	**0**	**0**	**2664**	**5815**	**+118.28**
NAV Portugal•	148 567	122 726	−17.39	798	1775	+122.43	0	0	0
NAVIAIR	109 745	123 763	+12.77	2254	939	−58.34	99	142	+43.43
Oro navigacija	20 916	25 064	+19.83	191	195	+2.09	187	116	−37.96
PANSA	164 733	171 300	+3.98	1259	811	−35.58	663	575	−13.27
ROMATSA	171 792	158 371	−7.81	88	214	+143.18	951	298	−68.66
Skyguide	184 020	216 899	+17.87	5933	7995	+34.75	2532	1097	−56.67
Slovenia Control	30 821	30 045	−2.52	308	374	+21.42	0	1	–
SMATSA	63 286	73 105	+15.52	607	0	–	3596	1512	−57.95
UkSATSE	187 955	256 992	+36.73	0	0	0	0	0	0

Extracted. Annual changes in % computed by author. Note: Data for the ANSPs denoted by •, i.e. Avinor, NAV Portugal and NATS are for the continental portion of ANS. Bold indicates the biggest European ANSPs.
Source: (Eurocontrol, 2015) and (Eurocontrol, 2012).

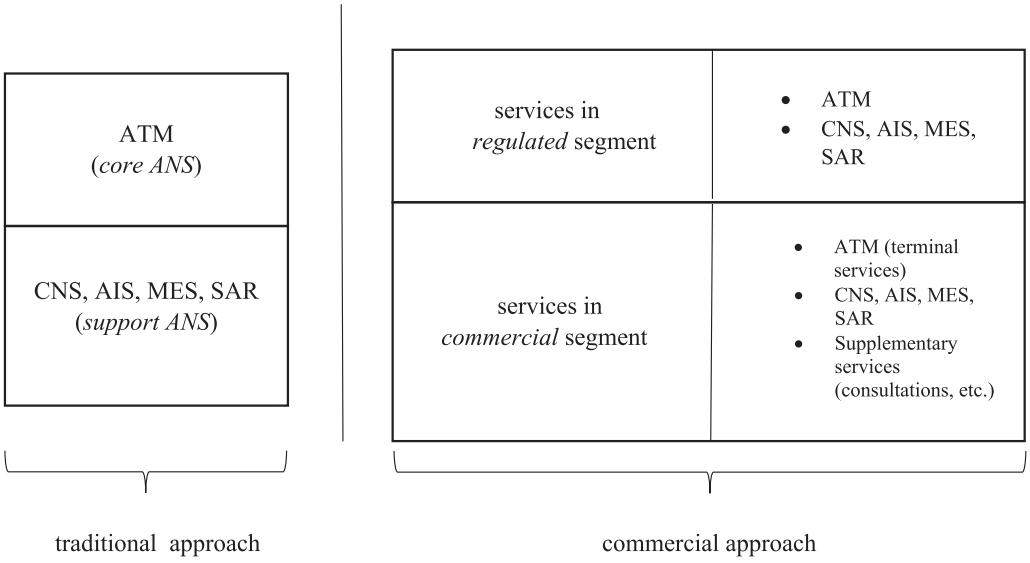

Fig. 1. Traditional vs business approach to the portfolio of ANS (bundled concept).

activities are rare and marginal, and a new commercial one with an important role for commercial business in the ANSPs economics

Table 2
Declared commercial strategy of European ANSPs.

ANSP/Country	Governance model (according to the information in ATM CE benchmarking report of Eurocontrol (2015)	Declaration of commercial business strategy
ENAV/Italy	Joint stock company (state owned)	… 'a global leader … This excellent (i. e. financial, note of the author) result is the consequence of outstanding economic, financial and operational management as well as the expansion of commercial activities to the international markets' …
LFV/Sweden	State enterprise	… 'LFV will have a leadership function which can meet the future, has a customer focus and acts in a commercial manner' …
ENAIRE (previously AENA) Spain	State enterprise	… 'the goal of AENA air navigation to expand its business beyond Spain border became a reality in 2013 with continuing a new projects to expand its business abroad …
NATS/Great Britain	Joint stock company (part-private)	… 'a major focus this year has been on securing a satisfactory outcome to the regulatory settlement for Reference Period 2 (RP2) (2015–2019) for our economically regulated business and, for NATS Services, on continuing to capitalise on new commercial opportunities in the UK and overseas … we are continuing to develop our commercial capabilities and placing increased emphasis on international partnerships to access new markets while minimising commercial risk' …
DFS/Germany	Limited liability company (state owned)	… 'DFS is improving its competitiveness and is systematically expanding its commercial business. It analyses the competition and acquires new business' …
ANS CR/Czech Republic	State enterprise	… 'ANS CR will continues to strengthen and expand its commercial activities in the field of training and special consultations and will keep trying to set a footholds in new markets' …

Source: Compiled by the author using annual reports, business plans and other information obtained from the ANSPs' web pages.

and management. The commercial business model of ANSPs may be recognised according to several attributes: a considerable proportion of services is delivered on a commercial basis, product portfolio is broader, encompassing core ANS services, support ANS as well as supplementary services; product innovations are important in product portfolios; commercially delivered services are marketed internationally (global placement of services); debt and equity structure is more complex to ensure requirements of commercial business; separate units responsible for commercial business are created within organisation structures; human resource management is more aimed at people capable of conducting commercial business with ANS; equity stakes in further companies (also abroad) are typical; corporate governance of entities in a group is needed. As depicted in Fig. 1, not only support ANS and supplementary services of ANSPs, but also core ANS services (terminal control services) can be delivered on a commercial basis. Although supplementary services may relate to the core or support services, we denote them as supplementary to the core and support ANS. For instance, training of air traffic controllers relates to air traffic control services within the ATM component and it is included in the commercial segment when such training is delivered commercially, for instance for other ANSPs.

There are several examples from practice which support the list of attributes typical for the commercial business model of ANSPs we have stated here. Besides its core business, DFS delivers projects, consultations, publications, apron management services and training. In 2014, commercially delivered services of DFS made up roughly 90.3 percent within the sum of revenues from other ANS and other revenues, thus generating €21.9 million. ENAV Group posted revenues from commercial activities at € 9.5 mil. in 2014. Within the commercial business model of ANSPs, commercially delivered services are placed internationally using different channels. In 2013, AENA (now ENAIRE) signed an agreement with ANZ (New Zealand) to create the company Group EAD APAC (80% ANZ, 20% Group EAD) in New Zealand to provide aeronautical information services in the Asia-Pacific region (Group EAD owned by 36% by AENA). In 2014, the DFS Group won the competitive tender issued by Gatwick Airport Ltd. (GAL) for the provision of ANS at London Gatwick Airport. LFV entered into a five year agreement with Abu Dhabi Airports Company (ADAC), providing civil ANS in the United Arab Emirates for ADAC's airports in the Emirate of Abu Dhabi. In 2013, ENAV Asia Pacific was set up in the ENAV Group to ensure the development of commercial activities in Asia and Oceania. ENAV North Atlantic, a limited company governed by the law of the State of Delaware, was established in January 2014 to acquire 12.5% of the share capital of Aireon LLC, a US registered limited liability company belonging to the Iridium group which, by 2018, will create the first global satellite surveillance system for air traffic control. To fund their commercially delivered activities, ANSPs started to use financial instruments typical for the commercial sector, such as DFS, which, at year-end 2014 had an issuing volume of bonds with a nominal value of €47.2 mil. The commercially driven strategy of the ANSPs which implemented the new commercial business model is also reflected in organisation and management structure as in ENAV, where, within the board of directors, a director for international strategies and a director for business development are established.

4. Commercialisation of ANSPs reflected in benchmarking ratios

Assuming commercial business and commercial revenues of European ANSPs are impossible to neglect, they ought to be included within the benchmarking of ANSPs economic performance. A multidimensional approach would need to work with commercial revenues listed in the ANSPs outputs, which is still not a standard. An approach to benchmarking based on partial indicators would need to work with a set of specific indicators based on commercial revenues. We design them in Table 3.

Indicators comparing commercial revenues against other and total revenues reveal the role of commercial revenues in the funding of ANSPs. They are the revenue structure indicators. Commercial revenues per one employee and commercial revenues per one employee in support staff express an average level of labour productivity with regard to the generation of commercial revenues. Moreover, commercial revenues divided by labour costs (total staff and support staff) inform how labour costs are covered by commercial revenues, indicating the weight of commercial revenues in the labour cost coverage. The indicator based on commercial revenues compared against net income enables us to investigate the role of commercial revenues in terms of net profit generation. Commercial revenues divided by the number of composite flight hours within a regulated part of the ANSPs business reflect both segments of the ANSPs performance and serve as the two-part

Table 3
Partial indicators based on commercial revenues in the ANSPs benchmarking.

Revenue structure indicators (reflecting commercial revenues)		Productivity indicators (based on commercial revenues)				Net income coverage indicator	Two part performance indicator (core regulated segment vs commercial segment)
Commercial revenues/ other revenues	Commercial revenues/total revenues	Commercial revenues/staff number	Commercial revenues/total labour costs	Commercial revenues/ support staff	Commercial revenues/support staff labour costs	Commercial revenues/net income	Commercial revenues/CFHs (in a core regulated segment) or commercial revenues/revenues from charges

Source: Author.

indicator comparing the development in regulated businesses and commercial ones. The variant of this indicator could also be based on revenues from charges for regulated ANS in spite of CFHs. We deem that just these indicators could enrich the current Eurocontrol and CANSO benchmarking methodologies which are one-sidedly aimed at the cost side, leaving commercial revenues unheeded. The design of commercial business indicators was inspired by partial indicators which are used in the benchmarking of airports, although the specific nature of ANS was respected. To document the viability of the designed ratios (at least some of them), we computed some of the designed ratios for DFS and ENAV Group in 2014 as contained in Table 4.

5. More commercial business of European ANSPs in future?

To answer the question about the future commercial business of ANSPs in Europe, we must explain the factors which have promoted the commercial activities of some European ANSPs so far. Like any business problem, the commercial business of ANSPs also has its own demand side and supply side explanation. On the demand side, there have been many countries, mainly in so called emerging world regions, which have started to demand the delivery of ANS by other ANSPs. This demand could be generated by different motives – insufficient capacities, modernisation and quality issues, cost-effectiveness etc. On the supply side, the provision of commercially delivered services of ANSPs has been initiated by an effort of some European states to increase cost efficiency in the provision of terminal services. These states deregulated their ANS industry and enabled third parties to enter the national markets, and this deregulation is seen by us as one of the most important supply side drivers of the ANSPs commercial business in Europe. Moreover, still on the supply side, the process has been strengthened by the European regulatory framework, which enabled the removal from the strict regulation of the services delivered on a competitive basis (i.e. provided under market conditions), whether terminal services or MES, AIS, CNS. Commercial activities were one of the possible solutions to meet the requirements of the European Commission stated within the key performance area for cost-efficiency (and subsequently pricing) goals in the regulated part of business, and simultaneously collect sufficient revenue streams (supported by commercial revenues). Moreover, under the single till regime of regulated prices, European ANSPs could compete on the market with en route services more efficiently, using the impacts of commercial revenues on prices (en route unit rates). Also, the capital intensity of newly emerging sophisticated technologies explains why several ANSPs have started to join funds with other ANSPs and/or private capital companies to achieve the desired technological progress. As a whole, commercial business has been self-generated through increasing competition of ANSPs in this segment of the ANS industry. It must be stressed in this context that the commercial business of European ANSPs would not be possible without changes to the ANSPs governance (corporatisation and with regard to British NATS privatisation) and changes in national regulatory legislation in some European countries (deregulation of terminal services).

Which factors could spur (or impede) the commercial business of European ANSPs in future? Provided there will still be competition among the European ANSPs, the commercial business of ANSPs will acquire more attention as it will become a competitive weapon in the European (and global) ANS industry. With regard to en route services, European ANSPs compete with each other for some portion of en route services (if substitute trajectories exist for overflights) and generation of commercial revenues can improve the en route service unit rates in competition and simultaneously meet the cost efficiency targets required by the European Commission. The EU legislation also imposing a tight regulatory framework over terminal services unless they are not provided under market mechanisms pushes member states to deregulate this business, creating in this way a demand for terminal services delivered on a competitive and commercial basis. Simply, the introduction of market mechanisms in the delivery of terminal services may be a mitigating strategy of states against the strict regulatory rules prescribed by the European Commission, thus promoting commercial business of ANSPs. The same driver will probably also act in this direction with regard to support ANS for the same reasons. On the other hand, putting some ANS under self-regulation through the market mechanism is just what the European Commission is preparing in order to restructure the ANS industry in Europe. Even if we suppose a radical structural solution of the ANS industry as it has been projected by the European

Table 4
DFS and ENAV Group partial indicators based on commercial revenues 2014.

Revenue structure indicators		Productivity indicators		Net income coverage indicator		Two part performance indicator (core regulated segment vs commercial segment)	
Commercial revenues/total revenues (in %)		commercial revenues/staff number (in € per employee per year)		Commercial revenues/net income (in %)		Commercial revenues/ revenues from charges (in %)	
DFS	ENAV Group	DFS	ENAV Group	DFS	ENAV Group	DFS	ENAV Group
1.93	1.14	3640	2846	62.7	23.75	2.07	n.a.

Source: Author using annual reports.

Commission (unbundling of services), and if support ANS were split from the core legacies (Tomová, 2015) and new support ANS companies were created, they are intended to compete with each other cross-border, which again stresses the importance of being competitive just now and using existing commercial opportunities already (Fig. 2).

Even in the case of such product unbundling, the new subjects providing core, i.e. ATM, business still may deliver some portion of their services commercially if demand will be generated, for instance by continuing deregulation of terminal services in Europe. Outside Europe, demand for the delivery of ANS (generated by demand for air services and technologies) can be a further factor promoting the European ANSPs to conduct commercial business on an international scale. Also, plans to privatise European ANSPs (under different scenarios of future structural reform) may boost the generation of commercial revenues, as the current ANSPs (or legacies) with long-term profitable commercial revenues may be more attractive for private markets and private investors. Commercial revenues themselves diversify the structure of ANSPs revenues, which could dampen impacts of traffic risks on total revenues as the commercial portion of revenues need not be (totally or partially) influenced by exogenous factors which decrease revenues from charges. Thus, commercial revenues can ensure the sustainability of total revenues for ANSPs, which may be a further motive to support implementation of the new commercial model of ANSPs by states. On the other hand, hardly predictable events in the sense of radical social, economic and political upheavals in the world could impede the evolution of commercial business in the ANS industry.

6. Conclusions and areas for further (commercial revenues) research

Although ANSPs were passive providers of ANS in history, nowadays at least several European ANSPs have developed their commercial activities and conduct commercial business significantly, even on an international scale. Implementation of the new commercial model in the provision of ANS brings issues for further ANSPs research in the following inter - related fields:

Funding and Pricing of ANS. Commercial business generates revenues of a commercial nature and diversifies sources for the ANSPs funding. As revenues from charges and commercial revenues are differently sensitive to traffic risk drivers, revenue generation may be a less risky process if ANSPS revenues are diversified. In general, more attention given to revenue-side in the management of ANSPs economics may partially solve the problems with ANSPs funding if we compare it with the traditional cost-side driven management of ANSPs, which was fully dependent on revenues from charges and governmental funds - and other marginally important sources. Moreover, traffic risk sharing and cost risk sharing introduced by the European Commission within the common charging scheme, does not allow the transfer of all revenue deficits on airspace users through prices (unit rates). Also in the cost-side, the ANSPs are not allowed to transfer all cost-inefficiencies onto airspace users. This naturally leads ANSPs to be more interested in the revenue-side of their business and exploit the potential for generation of commercial revenues. Activities of European ANSPs in the commercial segment prove that revenues are an active, i.e. manageable part of their economics. Although current economic research is continuously moving from cost-side issues to revenue-side ones, commercial revenues are not explicitly analysed as revenue maximisation (Castelli et al., 2013) or pricing problem of ANSPs (Bolić et al., 2014) also (Rigonat and Castelli, 2014).

Management of commercial ANSPs. Management of commercial ANSPs is more complex and across all managerial functions and operational units. Due to the commercial business model, there are more risks connected with commercial business and the range of stakeholders is broader, encompassing also customers in the commercial segment, creditors from private capital markets, companies within the group (if group structure was established to implement commercial business strategy), owners of the companies etc. Employees experienced in commercial business practices are needed, and, due to the international scale of commercial business, multicultural work groups exist within commercial ANSPs. This is a challenge for aviation universities to prepare future experts for different positions related to the commercial provision of ANS.

Quality and safety of ANS. The dual nature of the ANSPs economics (consisting of commercial part and regulated part) evokes some doubts about the co-existence of these two parts in one entity, namely with regard to quality and safety issues in the delivery of ANS, which is without any doubt a priority. One can argue that a commercially driven strategy could be prioritised over quality and safety issues. On the other hand, the commercial strategy of ANSPs may be used to achieve quality and safety goals, for instance through the above-mentioned joint ventures aimed at the development of new technologies. Also, when ANS are delivered internationally by European ANSPs outside Europe, it may also promote safety and quality due to spill-over effects based on the delivery of European safety and quality standards abroad.

Regulation of the ANS industry. In the European Union, the regulated and commercial segment in the ANS industry coexist as inter-related. Under the current rules, when commercial revenues are to be deducted when setting the regulated prices, single till scope of regulation is thus applied. Blondiau et al. (2014) investigated price-cap versus cost-plus regulatory mechanisms and their impact on the European ANSPs performance. Only hypothetically

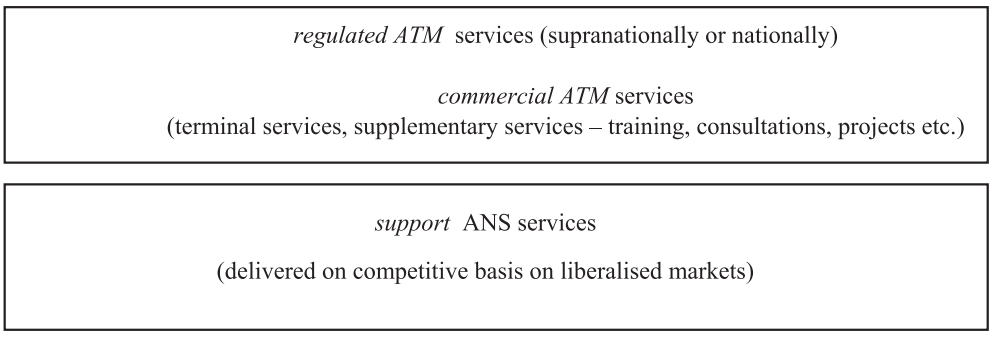

Fig. 2. Commercial and regulated segments in the unbundled ANS industry.

we can now ask how the commercial business of European ANSPs could evolve in the dual till regime of regulation. In the dual till regulatory scope, which strictly splits the regulated and commercial part, the commercial business would be let to live its own economic life. How could this influence the economic performance of European ANSPs, their funding and competition, cost efficiency, progress in technology etc.?

Competition of ANSPs in the commercial segment. Competition among European ANSPs in general is not supported by academic research, at least not sufficiently. This is also valid for competition among European ANSPs in the commercial segment. What are the competitive advantages of those European ANSPs which already compete with commercially delivered services? Who are latent competitors? How does the evolution of commercial activities impact on cooperation and/or competition of ANSPs within FABs? For smaller ANSPs within a FAB, we can expect that they will join the sources to conduct the commercial business, and larger ANSPs within a FAB can probably compete with each other. The size of ANSPs as a factor of competitiveness in the commercial business of ANSPs is not answered by economic research at all. Analyses of cooperation, competition at the level of FABs will need to add commercial revenues as outputs to FABs performance benchmarking (Button and Neiva (2013). Also, we see the role of commercial revenues in clustering European ANSPs to find more or less comparable groups of ANSPs, thus reflecting different business models applied by ANSPs within FABs. Simply, commercial revenues must be regarded if we try to understand the ANS industry as a whole, i.e. in line with the holistic approach as recommended by Quendt et al. (2007).

Structural reform in the ANS industry (*and the SES goal*). Due to the commercial business of ANSPs, more competition is delivered to the ANS industry which was traditionally structured and managed as regulated – nationally and/or on a wider supranational basis. Taking into account the ambitions of the European Commission to inject more market mechanism into the ANS industry, and restructure the ANS industry through product unbundling of support ANS, just those ANSPs which have already implemented commercial models will probably be better prepared for such structural change. Newly created support ANS companies having experience with commercial business will be more vital in the liberalised European market with support ANS, and more resistant to mergers and acquisitions. On the other hand, as potential for conducting commercial business is not only in the segment of support ANS, but also in the ATM segment, any analysis of potential paths in the provision of air traffic management in Europe (Adler et al., 2014) ought to consider the role of commercial business.

Commercial business conducted by ANSPs is a reality in Europe. Even under different scenarios of future development, we can expect that the demand and supply side drivers of the trend to commercial business of European ANSPs will operate in future, and the commercial business of European ANSPs will be reinforced. Therefore, revenues generated by the commercial business of European ANSPs must be investigated as a funding, pricing, managerial, regulatory and structural and competition issue to answer the question: *How* important are commercial revenues to today's European air navigation service providers?

Acknowledgment

The paper has been supported by the grant scheme MŠVVaŠ SR KEGA 024 ŽU-4/2014. The paper is also a scientific output of the project: “Centre of Excellence for Air Transport ITMS 26220120065”.

References

Adler, N., et al., 2014. Managing European air traffic control provision. In: Fourth SESAR Innovation Days, 25th – 27th November 2014. Available at internet: http://www.tmleuven.be/project/acchange/20141125_SID_NicoleAdler_paper.pdf.

Arnaldo, R.M., et al., 2014. European air navigation service providers' efficiency evaluation through data envelopment analysis (DEA). In: 29th Congress of the International Council of the Aeronautical Sciences. Available at: http://www.icas.org/ICAS_ARCHIVE/ICAS2014/data/papers/2014_0154_paper.pdf.

Bilotkach, V., et al., 2015. Cost-efficiency benchmarking of European air navigation service providers. Transp. Res. Part A Policy Pract. 77, 50–60.

Blondiau, T., et al., 2014. ACCHANGE: building economic models for understanding ATC performance. In: Fourth SESAR Innovation Days, 25th – 27th November 2014. Available at internet: http://www.tmleuven.be/project/acchange/20141125_SID_EefDelhaye_paper.pdf.

Bolić, T., et al., 2014. Better pricing strategies for ATM?. In: Fourth SESAR Innovation Days, 25th – 27th November 2014 Available at internet: http://www.sesarinnovationdays.eu/sites/default/files/media/SIDs/SID%202014-28.pdf.

Button, K., Neiva, R., 2013. Single European Sky and the functional airspace blocks: will they improve economic efficiency? J. Air Transp. Manag. 33, 73–80.

Button, K., Neiva, R., 2014. Economic efficiency of European air traffic control systems. J. Transp. Econ. Policy 48, 65–80.

CANSO, 2014. Global Air Navigation Services Performance Report 2014. Available at: https://www.canso.org/global-ans-performance-report-2014.

Castelli, L., et al., 2013. A network pricing formulation for the revenue maximization of european air navigation service providers. Transp. Res. Part C 33, 214–226.

Castillo-Manzano, J.I., 2010. Determinants of commercial revenues at airports: lessons learned from Spanish regional airports. Tour. Manag. 38, 788–796.

Regulation (EC) No 1794/2006 laying down a common charging system for ANS.

Regulation (EU) No 1191/2010 amending the Commission Regulation (EC) No 1794/2006.

Implementing Regulation (EU) 391/2013 laying down a common charging scheme for air navigation services.

Eurocontrol, 2012. ATM Cost-efficiency (ACE) 2010 Benchmarking Report with 2011-2015 Outlook. Available at: https://www.eurocontrol.int/sites/default/files/publication/files/ace-2010-benchmarking-report-and-outlook.pdf.

Eurocontrol, 2015. ATM Cost-efficiency (ACE) 2013 Benchmarking Report with 2014-2018 Outlook. Available at: https://www.eurocontrol.int/sites/default/files/publication/files/ace-2013-benchmarking-report.pdf.

FAA, 2015. Airport and Airway Trust Fund. Available at: http://www.faa.gov/about/budget/aatf/.

Fuerst, F., et al., 2011. The Sky is limit? the determinants and constraints of European airports commercial revenues. J. Air Transp. Manag. 17, 278–283.

Graham, A., 2009. How important are commercial revenues to today's airports? J. Air Transp. Manag. 15, 106–111.

ICAO's Policies for Airport Charges and Charges for Air Navigation Services. Doc 9082.

Kratzsch, U., Sieg, G., 2011. Non-aviation revenues and their implications for airport deregulation. Transp. Res. Part E Logist. Transp. Rev. 47, 755–763.

Lin, Y., Chen, Ch, 2013. Passengers' shopping motivations and commercial activities at airports – the moderating effects of time pressure and impulses buying tendency. Tour. Manag. 36, 426–434.

Mouchart, M., Simar, L., 2003. Efficiency Analysis of Air Navigation Services Provision (II): Further Insights, 0303 Consulting Report.

Olariaga, O.D., 2015. Desarollo reciente y relevancia actual de los ingresos comerciales aeroportuarios. Estud. Gerenciales 137, 393–402.

Quendt, T., et al., 2007. European air navigation service providers at the crossroads. Int. J. Manag. Cases 9 (3/4), 270–282.

Rigonat, D., Castelli, L., 2014. Pricing Technique for the European Airpspace.

Tomová, A., 2015. The need for new directions in airspace economics: seventy years after Chicago. J. Air Transp. Manag. 44–45, 1–7.

Tovar, B., Martín-Cejas, R.R., 2009. Are outsourcing and non-aeronautical revenues important drivers in the efficiency of Spanish Airports? J. Air Transp. Manag. 15, 217–220.