Untapped potential of on-board advertising

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Abstract— **Today advertisements can be seen everywhere, on the seats of grocery carts, on the walls of an airport walkway, on the sides of buses, heard in telephone hold messages and they can even be seen on the fuselage of an aircraft or on-board. On-board advertising recently becomes a significant source of revenues for airlines all over the world. Inspired by ground public transport, air carriers have started to explore a great potential of on-board marketing and advertising. Advertising on-board provides smarter and cost-effective way of communicating with the customer and it is one of the new methods to inform potential customers about products and services and how to obtain and use them. However, compared to other means of transport, the potential of advertising on-board of aircraft seems to be untapped. It is necessary to realise that revenues from on-board advertising can help airlines to keep their competitiveness. Despite the fluctuation of fuel price, airlines will be able to maintain constant fare thanks to revenues from advertising. The main objective of our study is to analyse a real potential of on-board advertising. The study is mainly focused on low-fare airlines as these reach both high fleet utilisation and high load factors. These facts make low-fare carriers being an ideal market for on-board advertising. By means of this study, we would like to answer the question, if Michael O'Leary's dream of no-fare airline can come true in near future or if it is just utopia.**

Keywords; on-board advertising, ancillary revenues, operating costs

I. INTRODUCTION

Public transport is generally considered to be very valuable marketplace for advertising. In big cities, there are thousands of people using public transport services every day. In London, over 3 million passenger journeys are made across the underground network every day and London Tube earns billions of Euros every year from its advertising space [1]

Commercial advertising is an indispensable source of revenue for many coach and railway operators, providing services on the regional, national, and international level. In the field of passenger transportation, advertising becomes a very efficient tool for being competitive.

Compared to other means of transport, air transport seems to be behind in the on-board advertising development. Many airlines have already started to use the advertising space in aircraft cabins for the promotion of hotel chains or car rental companies but the market is by far untapped. Moreover, the development in the field of on-board services and on-board entertainment will definitely lead to an increase of the on-board commercial advertising potential.

The main aim of this article is to perform an analysis of the on-board advertising potential and find out if further development in this field can provide airlines with sufficient financial resources and thus lead to deployment of the no-fare business model. In our opinion, a good concept of on-board advertising can bring a significant competitive advantage for many airlines regardless of their business model. The advertising revenues can partly compensate growing fuel prices, and traditional airlines do not need to collect fuel surcharges. On-board advertising in combination with latest on-board technologies could also lead to transformation of low-fare airlines to no-fare airlines. Currently, no-fare flights are used as very efficient marketing tool, but in the future the on-board marketing and advertising may be used for reducing or covering the cost of travel.

The possibilities of on-board marketing and advertising are almost unlimited. It does not need to be used only for the promotion of hotel chains or car rental firms. The whole air transportation process provides a great resource of advertising channels and opportunities. The following list presents a fraction of possible advertising and marketing spots which are not exclusively on-board the aircraft:

- Menu card;
- Window application;
- In-flight announcements;
- Headrest covers;
- Product sampling;
- Air sickness bag;
- In-flight magazine;
- Exterior aircraft branding;
- Meal tray table back;
- Overhead bins;

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- Cabin crew uniforms;
- Boarding pass;
- Promotional leaflets;
- Happy Snack Bags;
- Drink Tumblers;
- Napkins;
- On-board testing (e.g. wine, perfumes);
- In-flight entertainment (IFE) systems.

II. PSYCHOLOGY OF ON-BOARD ADVERTISING

In general, passengers perceiving advertisements on-board an aircraft are considered to be a good target for marketers. The reason is simple. The aircraft cabin is a closed space restricting the movement of passengers. Remaining seated for several hours at one particular place a passenger would start reading an in-flight magazine, pay attention to headrest covers and read all the booklets. Another reason that marketers are interested in the passenger is free time that he/she has to perceive an advertising message.

Psychological condition of passenger plays an important role. As passenger does not assume huge advertising campaigns as it is seen on TV he will perceive messages from in-flight magazine more quietly. Moreover, there is an opportunity of repeated contact with the advertising message. Having looked through all products offered the passenger may turn once again to the booklet or journal which was liked. According to statistics, 20 % of air passengers take a magazine with them after the flight [16]. Although in-flight magazines can be found in each aircraft (no matter of what kind of airline an aircraft belongs to) the concept of magazine as well as whole on-board marketing and advertising needs to be different for each airline, depending on its business model and taking into account requirements and needs of its passengers, considering that the passengers' needs and requirements can be specific regarding particular city pairs.

It is also necessary to point out that current marketing and advertising opportunities will multiply once the passenger is connected to Internet or is allowed to use his/her Blackberries or phones during the flight.

III. DIFFERENT BUSINESS MODELS

A. Traditional Airlines

The operational model of most traditional airlines is based on hub-and-spoke operations. Their networks usually consist of short-haul and long-haul routes. The flight schedule is set in order to offer passengers the most attractive times and to ensure the connectivity between short-haul and long-haul flights. In other words, during the day there is a time when short-haul flights feed the long-haul flights and there is also a time when long-haul flights feed short-haul connecting flights. Thanks to this feature, the operation of traditional airlines at major airports form typical arrival and departure peaks.

Traditional airlines form alliances (e.g. Star Alliance, One World, and Sky Team). Thanks to membership in alliances, the traditional air carriers are able to take passengers seamlessly from anywhere to everywhere.

Nowadays, the traditional airlines have a monopoly in the long-haul market. Long-haul operation generates an indispensable number of passengers for connecting short-haul flights.

Advertising in the cabin of long-haul aircraft can have disadvantages due to several reasons. Although long-haul aircraft have huge seat capacity, these are able to carry only limited passengers per day. Due to long legs, the aircraft can be operated only on one or two flights per day. It means that only a limited number of people will see the advertisement. Moreover, taking into account a flight lasting 10 – 15 hours the cabin full of posters could be disturbing and could reduce the level of passenger's comfort.

On the other hand, the cabin of long-haul aircraft could be a great place for on-board marketing (e.g. tasting of wine). Wide-body aircraft are also usually equipped with excellent in-flight entertainment systems. Once the in-flight connectivity is introduced, these systems will become a virtual store of unlimited possibilities.

Considering the short-haul flights operated by traditional airlines, these provide more space for on-board advertising. The requirements posed on the level of comfort in the cabins of short-haul aircraft are much less demanding compared to long-haul aircraft. Although daily utilisations of these aircraft are significantly lower, they are able to fly about 6 legs per day. As a result of this, more passengers could be carried during each day.

B. Charter airlines

The charter airline business model is based on selling whole seat capacity of the aircraft to tour operators. Once the contract between airline and tour operator is signed, marketing and consequently the load factor is tour operator's responsibility.

The charter airline operation and business model is currently the most efficient in the market as all flights are profitable for the air carrier. The tour operator bears the risk of financial loss.

Charter airlines usually have very high fleet utilisation. The fleet utilisation can reach as much as 17 hours per day. These carriers operate short- to medium- haul point-to-point flights. Their flights are not scheduled. Time and destination of each flight depends on the requirements of the tour operator.

These airlines usually operate single aisle aircraft, with high density seating configuration. Depending on route lengths, the aircraft can fly 6 to 8 legs per day. Moreover, most of their passengers are holidaymakers. Charter airlines are therefore a huge and very specific market that is considerably easy to address by properly selected advertisement.

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C. Low-fare airlines

The low-fare business model is based on reducing operating costs with a view to offer passengers a very competitive fare. The air ticket price usually include only air transportation and all additional services like airport check-in, priority boarding and on-board services are charged extra.

Low-fare airlines operate scheduled, short-haul, point-to-point passenger services serving usually regional or secondary airports. In order to reduce operating costs, these carriers operate single type fleet and cabins of their aircraft have very high density seating configuration. Average fleet utilisation usually reaches more than 12 hours per day and each aircraft flies about 8 legs per day.

As these airlines usually offer the lowest possible fare, they are able to achieve average load factor of more than 80 %. Thanks to these features, the aircraft operated by low-fare airline can carry more than 1,200 passengers per day. It means that low-fare market has very good potential regarding on-board marketing and advertising as it hits relatively high number of potential customers.

It is also possible that growing revenues from advertising will sooner or later lead some low-fare carriers to introducing no-fare business model. Advertising and additional services will become primary source of profit for such airlines and air transportation will be provided to passengers for free. Of course, the transformation from low-fare to no-fare business model will be feasible only for the biggest in the market (e.g. Ryanair). The advertising revenues directly relate to fleet size, aircraft utilisation and load factors. Taking into account Ryanair's performance in recent years, its aircraft are very attractive and very efficient advertising channels.

For our further analysis, we have selected low-fare business and operational model as it seems that high aircraft utilisation and high load factors make low-fare airlines be a good marketplace for on-board advertising and its further development. Moreover, thanks to low operating costs these airlines are very close to deploy no-fare business model.

IV. ANALYSIS OF LOW-FARE AIRLINES ANCILLARY REVENUES

Revenues from non-ticket sources (ancillary revenues) are of vital importance for many airlines worldwide, especially for those running low-fare business models. These revenues are generated mostly by the services that passengers are to buy before or during their travel experience. Legacy airlines bundle these services into the price of air ticket while low-fare airlines charge them extra. TABLE I shows potential sources of non-ticket revenues for airlines.

TABLE I. : POTENTIAL SOURCE OF ANCILLARY REVENUES FOR AIRLINES

Ancillary Revenues	On-board sales of food and beverages
	Baggage check-in charges
	Excess baggage charges
	Seat assignments charges
	Fee charged for purchases made with credit cards
	Commissions from the sales performed via airline website (e.g. hotels, car rentals, transportation from/to airport)
	Commissions from the sale of travel insurance
	Commissions from the sale of airport lounge access
	On-board advertising

Some legacy carriers use other sources of non-ticket revenues. For example: miles or points sold to banks issuing co-branded credit cards, travel partners such as hotel chains and car rental companies and other partners such as online malls, retailers and communication services. These services refer to frequent flyer ancillary revenues and we will exclude them from our analysis as we are focusing on low-fare airlines' business model.

To introduce no-fare operational model, low-fare airlines will rely strongly on ancillary revenues and on-board advertising revenues. Even now, many airlines try to attract their passengers to buy as many non-ticket services as possible. Aircraft cabins full of on-board advertisements can be widely seen as well.

This is happening because non-ticket services and on-board advertising revenues are becoming of high value for low-fare airlines. Considering major European low-fare airline Ryanair, its non-ticket services and on-board advertising generated as much as € 8.5 per passenger in 2007 [2]. Other examples of specific ancillary revenue amounts including on-board advertising revenues can be seen on the following figures. Fig. 1 shows ancillary revenue amounts per passenger for three well-known European low-fare airlines in 2006 and 2007. Fig. 2 shows ancillary revenues per aircraft per month for the same carriers.

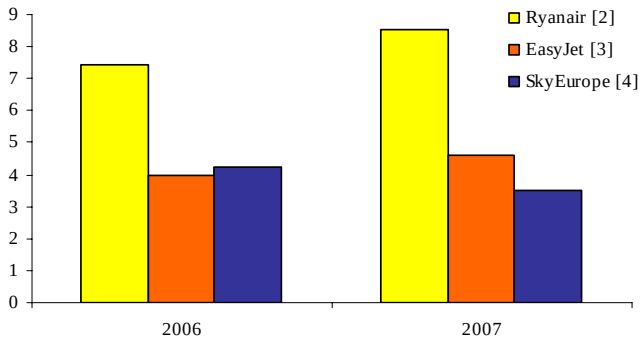

Figure 1. Per passenger ancillary revenues (€)[a]

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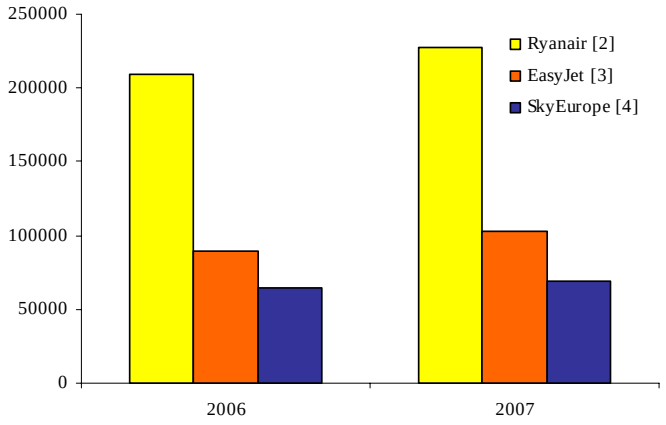

Figure 2. Ancillary revenues per aircraft per month (€)[a]

a. Aircraft types and numbers used for the analysis:

Ryanair:	*2006*	*120 B 737-800 (189 seats)*
	2007:	*133 B 737-800 (189 seats)*
EasyJet:	*2006:*	*87 A 319 (156 seats)*
		32 B 737 – 700 (149 seats)
		3 B 737 - 300 (149 seats)
	2007:	*107 A 319 (156 seats)*
		30 B 737 – 700 (149 seats)
SkyEurope:	*2006:*	*14 B 737-700 (149 seats)*
	2007:	*14 B 737-700 (149 seats)*

Ryanair and other carriers offer many of their flights for less than € 10 (when booked in advance). It is interesting that (according to the Fig. I) ancillary revenues per passenger collected by Ryanair in 2007 are almost the same (€ 8.52) [2]. Average annual growth (2005-2007) of ancillary revenues (15% for Ryanair and more than 20% for EasyJet) shows potential of further increase in number of air tickets given to passengers for free. Although the annual growth in the case of SkyEurope was not so significant, results of our consultations with SkyEurope representatives indicates that this trend will change in near future and SkyEurope will follow its competitors.

V. ON-BOARD ADVERTISING REVENUES AS A SIGNIFICANT SOURCE OF AIRLINES' PROFIT

Some airlines provide exact figures regarding on-board advertising revenues in their annual reports. For example Air Berlin generated revenue of €1,500,000 (€ 0.11 per passenger) from advertising in its in-flight magazine in 2005. This revenue was slightly less than revenues from trip-insurance (€ 0.12 per passenger) and pre-assigned seats (€ 0.12 per passenger) [5].

EasyJet quantified its on-board advertising revenues up to € 55 million last year [3]. The revenue of € 1.43 per passenger from on-board advertising makes this airline 13 times more successful than Air Berlin. These figures give EasyJet a potential for further development and reflect the fact that airline's high revenues from on-board advertising and non-ticket services are not a utopia. However, there is still the question if Ryanair and other low-fare carriers will be able to introduce no-fare business model in near future.

It is clear that Air Berlin, EasyJet and Ryanair already offer free fares to its customers. One quarter of Ryanair's passengers travel "for free". It is marketing policy that says: "We are offering you the lowest possible fare and you don't need to look for better value for your money."

But Ryanair's chief executive officer Michael O'Leary goes even further and promises making all the flights free by 2010. He might be slightly optimistic because his company generated the biggest ancillary revenues per passenger in the market (as for 2007 [2]) although it currently uses only four on-board advertising channels. As shown in TABLE III, there are some other channels (including prices) that are not used by Ryanair but remain interesting for other carriers.

VI. OPERATING COSTS PER AIRCRAFT PER MONTH

For further analysis we had to estimate monthly operating costs of aircraft operated by low-cost carrier. As our further analysis is focused mainly on SkyEurope's and Ryanair's business models, our estimation of operating costs is based on SkyEurope's and Ryanair's annual costs breakdowns and considers both B737-700 and B737-800 aircraft.

In our calculation, we assume that proportion of particular cost items in single year time horizon (as published in airlines' annual reports) is same as the proportion of particular cost items per block hour. If we know the proportion of particular cost items and value of at least one cost item, we are able to calculate other cost items (see TABLE II). In our calculation, the fuel costs were used as a baseline, as we were able to calculate these for each aircraft type using Eurocontrol BADA's Aircraft Performance Summary Tables [10]. Needless to point out, that both airlines Ryanair and SkyEurope use single type fleets.

TABLE II. ANNUAL COSTS PROPORTIONS [IN THOUSANDS OF €]

Operating costs	**Ryanair [2]**		**SkyEurope [4]**	
	Costs	Proportion	Costs	Proportion
Aircraft fuel	693331	39.28%	57892	22.60%
Sales and marketing	23795	1.35%	13231	5.16%
Maintenance, material and repairs	42046	2.38%	19405	7.57%
Staff costs	226580	12.84%	25832	10.08%
Navigation charges	199240	11.29%	23522	9.18%
Airport and handling charges	273613	15.50%	70477	27.51%
Depreciation and amortisation	104859	5.94%	15304	5.97%
Aircraft rental	143503	8.13%	1488	0.58%
Other	58183	3.30%	29029	11.33%
Total	1765150	100.00%	256180	100.00%

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TABLE III. : ON-BOARD ADVERTISING REVENUES ACCORDING TO CHANNELS USED BY DIFFERENT LOW-FARE AIRLINES IN 2007 (€)

Channel	**RYR [6] [b]**	**GWI [7] [b]**	**WZZ [8] [b]**	**ESK [9] [b]**	**Generic Airline**
Menu card				360	360
Window application				1,500	1,500
In-flight announcements		29,900			29,900
Headrest covers		29,900	7,200		29,900
Product sampling		4,000		570	4,000
Air sickness bag				2,750	2,750
In-flight magazine	Ink Publishing[c]	UHURA[c]	Ink Publishing[c]	Ink Publishing[c]	n/a
Exterior aircraft branding	16,700	12,500		15,000	16,700
Meal tray table back	13,700	12,600	5,000	3,500	13,700
Overhead bins	19,500		8,000	3,500	19,500
Cabin crew uniforms			880	350	880
Boarding pass		24,900			24,900
Promotional leaflets		1,750		430	1,750
Happy Snack Bags		6,250			6,250
Drink Tumblers		6,250			6,250
Napkins		6,300			6,300
E-ticket banner[d]				8,000	8,000
Newsletter banner[d]		1,100		40,000	40,000
Booking engine banner[d]		280			280
Booking confirmation banner[d]		1,080			1,080
Potential advertising revenue per aircraft per month	49,900	136,810	21,080	75,960	191,300

b. Acronyms (according to ICAO): RYR – Ryanair; GWI – Germanwings; WZZ – Wizz Air; ESK – SkyEurope

c. Airlines usually use services of specialised publishers to produce their in-flight magazines. The very competitive business of these specialised publishers (e.g. Ink Publishing, UHURA) is based on production of in-flight magazines for airlines all over the world. Both production costs and profit of the publisher are covered by advertising in these magazines. Each airline has its own in-flight magazine which is adapted to its specific needs and requirements. Magazines are provided to airlines for free and usually do not generate air carriers any direct revenues. The main purpose of in-flight magazines from airlines' point of view is promotion of airlines' services and destinations. The articles in these magazines should motivate passengers to travel with a particular airline. Production of in-flight magazines is based on „Reason to fly" policy.

The advertising revenues of in-flight magazines relates to number of passengers that can potentially read the magazines. Therefore the in-flight magazines are provided to airlines for free but airlines have to guarantee certain fleet size, aircraft utilisation and load factors. In the case when airlines have operational or financial problems leading to reduction of fleet size or significant decrease of load factor, the publishers can withdraw the contract.

d. These channels are not considered to be on-board advertising channels however they directly relate to flying passengers. Passengers receive their e-tickets and booking confirmations after the online booking reservation (using booking engine) of their flights have been made. Newsletter is also of wide passengers' attention. Electronic newsletter is distributed to more than 3 million e-mail addresses (case of SkyEurope).

According to last Ryanair's annual report [2], average daily utilisation of its aircraft in 2007 was 13.56 block hours. Assuming that an average month has 30 days, the average monthly utilisation of one aircraft is 406.8 block hours.

According to last SkyEurope's annual report [4], average daily utilisation of its aircraft in 2007 was 10.75 block hours. Assuming that an average month has 30 days, the average monthly utilisation of one aircraft is 322.5 block hours.

Using Eurocontrol BADA's Aircraft Performance Summary Tables [10], we have estimated an average fuel consumption of both aircraft types considered. According to our estimations, fuel consumption of B737-700 is 680 US gallons per block hour and fuel consumption of B737-800 is 690 US gallons per block hour. According to IATA Fuel Monitor website [11], the average fuel price in 2007 was € 1.56 per US gallon.

It means that monthly fuel costs per SkyEurope's B737-700 are € 342,108 and monthly fuel costs per Ryanair's B737-800 are € 437,880.

Further calculations are based on operating cost breakdown as stated in the latest Ryanair's [2] and SkyEurope's [4] annual reports. Other operation costs were calculated considering the ratio of fuel costs and particular operating cost items.

Following TABLE IV shows SkyEurope's and Ryanair's monthly operating costs per one aircraft.

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TABLE IV. : CALCULATION OF MONTHLY OPERATING COSTS PER AIRCRAFT IN 2007 (€)

Operating costs	Ryanair [2]	SkyEurope [4]
Aircraft fuel	437,880	342,108
Sales and marketing	15,028	78,188
Maintenance, material and repairs	26,555	114,672
Staff costs	143,099	152,652
Navigation charges	125,832	139,001
Airport and handling charges	172,803	416,478
Depreciation and amortisation	90,631	8,793
Aircraft rental	36,746	171,544
Other	66,225	90,438
Total	1,114,797	1,513,875

According to figures from the latest annual reports [2] and [4], Ryanair carried 42,500,000 passengers and SkyEurope carried 3,312,443 passengers in 2007. Considering these figures, one SkyEurope's aircraft carried 19717 passengers in an average per month and one Ryanair's aircraft carried 26629 passengers in an average per month. It means that operating costs per passenger amount € 76.78 in case of SkyEurope and € 41.86 in case of Ryanair.

The following TABLE V. shows potential advertising revenues per passenger calculated according to number of passengers carried by particular airlines in 2007. Analysis in TABLE V. refers to maximum potential of on-board advertising revenues but does not reflect current figures of advertising revenues.

As shown in the table, there are big differences between potential advertising revenues per passenger as they are directly connected to number of passengers carried, fleet size and daily utilisation. Germanwings seems to be the most effective compared to its competitors however it carried almost 6 times fewer passengers than Ryanair. This results from the fact that the number of aircraft used by Ryanair is almost 5 times higher than number of aircraft used by Germanwings as well as from the fact that there is strong imbalance in number of on-board advertising channels used by these airlines.

SkyEurope has started to work on identifying on-board advertising opportunities 6 – 9 months ago. Currently it offers several advertising channels not only on board of its aircraft, but on company's website as well. It is anticipated that in near future the advertising will generate a significant portion of its revenues.

There are still some advertising channels that are not used by particular airlines but remain interesting for others. In order to achieve the maximum potential of on-board advertising; revenue airlines could preferably use all the available advertising channels. This is met in our model of Generic Airline that virtually uses all the above listed channels. We have defined Generic Airline with a view to analyse the maximum potential of all currently known advertising channels taking into account that these would be used by one airline. As channels are considered to be sold at their maximum market prices (according to the analysed air carriers' price lists), the highest possible advertising revenues can be achieved.

Taking into account the available data, number of passengers per month per aircraft for the Generic Airline was calculated as an average of Ryanair's, SkyEurope's, Wizz Air's and Germanwing's figures.

TABLE V. : ESTIMATION OF POTENTIAL ADVERTISING REVENUES PER PASSENGER (€)

	RYR [2]	GWI [7]	WZZ [8]	ESK [4]	Generic Airline
Number of passengers in 2007	42,500000	7,090000	3,000000	3,312443	n/a
Fleet (number of aircraft) in 2007	133	27	15	14	n/a
Number of passengers per aircraft per month	26,629	21,883	16,667	19,717	21,224
Potential advertising revenue per aircraft per month	49,900	136,810	21,080	75,960	191,300
Potential advertising revenue per passenger	1.87	6.25	1.27	3.85	9.01

VII. CONCLUSIONS AND OBSERVATIONS

A. *Generic airline potential*

The aim of our analysis was to assess current situation in advertising revenues that are generated by airlines. We also put emphasis on potential advertising revenues estimation.

Based on our calculations (see TABLE II.), operating costs per passenger amount € 76.78 in case of SkyEurope and € 41.86 in case of Ryanair. TABLE IV shows that our Generic Airline (using all advertising channels sold for the maximum market prices) generates slightly more than € 9 potential revenue per passenger. This means that advertising revenues of Generic Airline could possibly cover up to 12 % of current SkyEurope's operating costs per passenger (as referred in TABLE II.) respectively up to 22 % of current Ryanair´s operating costs per passenger (as referred in TABLE II.).

Although it seems that our Generic Airline does not have a potential to generate advertising revenues big enough to cover the total operating costs of typical low-fare airline, there are at least two more sources of airlines' revenues. These sources relate to on-board marketing and airlines qualify them as listing and marketing fees for goods sold on-board aircraft (in case of SkyEurope listing fees are € 2,000 per product per year and marketing fees € 5,000 per product per year). In case of SkyEurope, on-board marketing generates inconsiderable revenues. There are also some airlines selling their flight timetables for advertising purposes.

B. *Risk analysis*

From our point of view we have identified two main risks resulting from airline's business being dependant on revenues

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from advertising. Once the model of no-fare airline is introduced airline may possibly face the rapidly changing demographic and social structure of its passengers. This can lead to the fact that price sensitive airline customers will no more be attractive market for advertisers.

There is one more risk that we have identified. Once the airline is dependent on revenues from on-board advertising the airline has to guarantee certain fleet utilisation as well as certain load factors. If there is a crisis in the air transport market (as the one after September 2001), the airline won't be able to fulfill the above mentioned conditions that are usually specified in the contract between carrier and advertisers. This can finally lead to loss of advertising revenues and consequently to worse airline's financial situation.

VIII. FUTURE OF ON-BOARD ADVERTISING

If 12 % of SkyEurope's operating costs per passenger respectively up to 22 % of Ryanair´s operating costs per passenger can be covered by existing advertising channels imagine that airlines used more channels of advertising and revenues in near future?

One channel which could help airlines to cover the operating costs from the advertising revenues is the in-flight entertainment (IFE) system. IFE is considered to be the future channel for advertising. IFE with personal LCD screens at every seat has always been a domain of long-haul wide-body aircraft. The passengers on single-aisle aircraft had to be satisfied with drop-down LCD screens or ceiling mounted CRT (Cathode Ray Tube) screens. However, the development of IFE systems goes further and some airlines, such as West Jet and Delta Airlines have already equipped their narrow body aircraft with personal screens on every seat. It is anticipated that development of new technologies like Electronic Paper Display (very light, very thin, flexible paper-like display with ultra-low power consumption) will make personal IFE systems very attractive for single-aisle aircraft [12].

Finally, it can be admitted that transformation of low-fare airlines to the no-fare business model is possible; partly thanks to on-board advertising revenues as well as increased prices of non-ticket services (including e.g. checked baggage fees, check-in fees and priority boarding fees). Such kind of transformation can only be expected in case of having a large fleet airline with sufficient aircraft utilisation and load factor. On the other hand, we are aware that utilisation of all the available ancillary revenues sources would generate significant investment costs as well as would lead to an increase of the operating costs. However, we anticipate that investments in future advertising channels will bring airlines continuous income.

Nevertheless, the introduction of the no-fare business model can lead to a significant change in airlines passenger demographic mix, which can potentially have a very negative impact on airlines attractiveness for the advertising market.

There are certainly many different scenarios how the LCC market strategy will evolve. We don't pretend that on-board advertisement will turn round the market and bring free flying. However, the income from on-board advertisement can be a contribution to further reduction of cost of travel and can expand the air travel market to new potential passenger who would not fly at all.

As already mentioned till this time the airline companies focused on additional financial sources closely related to the air travel (insurance, car rental, hotel accommodation etc.). The reason why the income form adverts was not used in larger extent yet is that it is completely different business and airlines don't have necessary know – how. With respect to this most airlines can sell the on-board advert capacity to specialised companies. However, to be able to maximise their profit they must be able to specify the advertising potential. Our paper could contribute to this.

IX. FUTURE WORK

Our initial research revealed both, the great potential of on-board advertising and several issues that will be addressed in our future research.

To be able to proceed further we will develop economical model that should allow us to perform demand sensitivity analysis as well as detailed what-if analysis. Our current work is focussing on various simulation scenarios that define various levels of airline's business dependency on on-board advertising revenues. The main aim of our research is to find ideal equilibrium between on-board advertising revenues and other sources of income considering various airline business models.

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