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Low-cost Airlines in Europe: Network Structures After the Enlargement of the European Union

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Abstract

The liberalization of the European air opened the strictly regulated European market, and contributed to the appearance and quick spread of the Low-Cost Carriers (LCCs). At the beginning of the 21st century the low cost traffic absolutely concentrated on the Western European market but after the enlargement of the European Union (EU) LCCs started their operations in Eastern Europe enlarging and enriching the former evolved network structures.

The aim of this paper is to trace the evolution of the route network as a result of EU expansion.

During the study we came to the conclusion that in the time period after the EU enlargement the European LCC traffic showed dynamic development, route networks widened and the number of accessible destinations doubled. Comparing the LCCs network structures we defined three main characteristics, which represents the North-South flows, the West-East routes and the mixed network structure.

Key words: Low-cost airlines, liberalization, low-cost model, low-cost networks

Introduction

The liberalization of the European air opened the strictly regulated European market and provided new rights for the airlines operating in the territory of the European Community. Gaining advantage of the new situation low-cost entrants appeared in the European Sky, who quickly obtained considerable market share and became serious rival to the Full Service Network Carriers (FSNCs).

Low-Cost Carriers (LCCs) have had a significant impact on the aviation industry developing their unique business model and establishing their point to point route network and are regarded as having revolutionized the way people travel (CAA, 2006). Considering this we assumed that the expansion of the EU had a similar effect on Eastern European aviation market than liberalization did on the Western one. Therefore the purpose of this paper is to examine how the enlargement of the EU altered the European LCC market primarily focusing on the changes of the LCCs network structures and defining the differences between them, so our main question was that what changes effected the EU enlargement on the European LCC networks structures? To represent these alterations we have compiled thematic maps comparing the route networks of the LCCs between 2004 and July 2009.

In the first half of our study, we summarize the deregulation and liberalization processes in the aviation sector and the appearance and spread of LCCs, their special business structure and general attributes. In the second part of the paper we outline, what changes had happened in the LCC market since 2004, pre-eminently focusing on the contemporary network structures.

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Methods and Data

At the beginning of our research we had to define what we understand as LCC. Following the academic literature which uses a range of expressions (including LCCs, and No-frills, budget or low fare airlines), we decided in this study to consider airlines as 'truly' LCCs, which are designed to have a competitive advantage in terms of cost over an FSNC and sold their tickets under 66% of FNSCs (Dobruszkes, 2006). We could have chosen another limit value but we opted for 66% for the better comparison to the former study of Dobruszkes 2006, who examined the LCCs route network reflecting the situation in 2004.

During the research, it was difficult identifying the LCCs, since there is neither an up-to-date list of them nor are all of the LCCs members of the ELFAA[1]. On the other hand certain carriers claim to be LCCs despite charging similar prices to the FSNCs due to the variety of surcharges. In addition, the situation of the LCCs is changing rapidly, in which bankruptcies (Sterling Airways), company mergers (Vueling and Clickair), and the foundation of new airlines play an important role.

Because of these dynamic changes, we could not rely on the outdated LCC classification, so we made a list reflecting the actual situation (July 2009). First of all, we compiled a more common database of LCCs from academic literature (CAA, 2006, Dobruszkes, 2006, Dobruszkes, 2009, Graham, Shaw, 2008) and internet sites (www.attitudetravel.com, www.lowcostairlines.org), in which airlines claiming themselves to be LCC were presented. Then we compared the fares[2] offered by LCCs and FSNCs on the same routes. The comparison prices were called down on the 16th July 2009 one month and three months in advance respectively. Using the previously mentioned limit value we identified 18 airlines (Table 1) which we accounted as truly LCCs indeed, so such carriers as Air Berlin, Smartwings or Cimber Sterling were eliminated, because they did not fulfill the 66% requirement.

To represent the networks of LCCs, we had to create our own database in which the previously defined LCCs and their network and destination properties were listed. For this, there was not a freely available database for us, so we gathered the data from the internet sites of the LCCs. Using the information collected before, we made a connection matrix used as a base drawing the thematic maps representing the networks of LCCs. These maps were the primary source of the comparison of the LCC networks after the EU enlargement and the situation before.

***Table 1** European LCC network data (2009)*

Airlines	Country	Number of Destinations	Number of Routes	Served Countries	Number of Airplanes	Operation start
Aer Lingus*	IRE	59	88	20	33	1936
Blue Air	ROM	34	45	11	8	2004
bmibaby	UK	29	63	8	20	2002
easyJet	UK	110	445	27	167	1995
Flybe	UK	56	162	12	59	2002
Flyglobespan*	UK	20	36	9	9	2002
Germanwings	GER	66	121	25	27	2002
Jet2	UK	48	105	19	31	2002
Monarch	UK	19	49	4	31	1967
Myair	ITA	31	50	13	9	2004
Norwegian	NOR	75	164	24	45	1993
Ryanair	IRE	145	818	25	183	1985
SkyEurope	SVK	33	57	17	14	2002
Transavia	NED	68	96	16	29	1966
TUIfly	GER	70	272	14	44	2007
Vueling	ESP	44	89	17	35	2004
Windjet	ITA	29	46	13	12	2003
Wizzair	HUN	52	143	19	26	2003

** This table does not include North-American destinations*
Source: made by the author according to LCC websites

1 ELFAA – European Low Fares Airline Association

2 We included in the prices the airport fees and the various surcharges as well (e.g. fuel charges)

In the text - according to the references – by West Europe we mean the EU-15 countries (Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Luxemburg, Germany, Italy, Portugal, Spain, Sweden, The Netherlands, United Kingdom) plus Switzerland, Iceland and Norway and by East Europe we mean the newly joined former Communist countries (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia).

The liberalization of the market and the LCCs

To better understand the present processes in the aviation industry, we have to review the deregulation and liberalization processes and one of their most important effects the impact and spread of LCCs.

After the Second World War strict regulation were inaugurated to control the dynamic growing air transportation sector. As a consequence, international air transportation was regulated by thousands of bilateral agreements (Button, 2009) stipulating the airports to be served and other matters including stopovers, frequencies, routes and capacities.

In such a regulated industry, large national carriers ruled the markets, and in lack of real competition it was unjustified for them to look for new successful markets and search for their own network's failures. The deregulation of the US airline industry effected great changes in the airlines network structures and business policies, because prices had to be aligned to the cost and operation expenses had to be profit oriented due to the free market. Subsequent upon the deregulation FSNCs switched from point to point transport to the hub and spoke system, because prices became primarily demand-oriented and economies of scale got more and more important. By contrast the newly-founded LCCs adopted the point to point system and started their operation with a unique business model (Cento, 2009). The liberalized market allowed LCCs to pick up the price-sensitive market share (Gillen, Gados, 2008, Pels, 2008) offering cheaper tickets.

A decade later as the US air market was liberalized the European policy makers decided to deregulate the European market. This process was carried out in three packages and the most important third package on 1st January 1993 freed the market[3] for the 15 European Member States. As a goal of liberalization there were no more restrictions for founding companies, the airlines were free to establish new routes and free pricing. The most expected issue of liberalization is the (price) competition between airlines, in which consumers gained the greatest advantages.

So first in North-America, then in Europe and now everywhere in the world, LCCs significant growth rates are the most important achievement of liberalization. But it would be a mistake to state that the success of the LCCs arises from market deregulation alone because liberalization is necessary but not sufficient condition for the spreading of the LCCs. Thus further important conditions should be mentioned (Table 2).

***Table 2** Catalyst for the spread of low costs*

• Deregulated markets
• Entrepreneurs[4]
• Population and relative wealth
• Airport availability/capacity sold cheap and free of congestion to allow intensive operations
• Internet – sales ease, simple tariff, price transparency, circumnavigation of travel agent control of distribution channel

Source: Francis, et al., 2006

Besides liberalization and the previously mentioned catalysts the key element was the invention and adaptation of the low-cost business model by Southwest in the United States. Southwest started their operation at the beginning of the 1970's, but it took almost twenty years for this innovation to spread worldwide (Dobruszkes, 2006, Franke, 2004, Jászberényi, 2003, Malighetti, et al., 2009). Initially, LCCs were successful because they were not about luring away customers from the FSNCs, but instead they aimed for a new consumer group by offering cheaper tickets making those people able to travel by airplane who would otherwise not have flown because of financial reasons (Franke, 2004, Gillen, Gados, 2008).

Although we use the LCC expression for a homogenous category researches verify that there is no consistent low-cost strategy (Pels, 2008), but this business model has a few variations. The basic business model (Table 3) was carried out by Southwest Airlines and its success can be measured in 30 years of consecutive profits, moreover in 2001 it was the most profitable scheduled airline in the world (Pate, Beaumont, 2006). The business strategies used by LCCs differ from each other in what condition they were formed (Francis, et al., 2006) and also how much the carriers adopted the ice breaking Southwest model. Due

[3] From total liberalization temporarily cabotage was excluded until 1st April 1997

[4] E.g. Herb Kelleher and Rollin King (Southwest); Tony Ryan (Ryanair); Stelios Haji-Ioannou (easyJet); Richard Branson (Virgin Blue)

to this, several variations of business models were set up inside the low cost category.

Five ways of developing the low cost business model (Francis, et al., 2006):

1. **Southwest copy-cats**
   This category consists of the airlines were founded from scratch by independent entrepreneurs. These carriers stand closest to the Southwest model (Ryanair, easyJet, SkyEurope).
2. **Subsidiaries**
   Typically those LCCs presenting this category, which are subsidiaries of national carriers, and they were established to gain market share from the already existing LCCs (bmi → bmibaby; British Airways → Go; SAS → Snowflake).
3. **Cost Cutters**
   The members of this group are such FSNCs which are trying to imitate the LCCs by cutting the operational costs. They continue to operate to a hub-and-spoke system while attempting to rationalize their fleet and stop in-flight catering (Aer Lingus).
4. **Diversified charter carriers**
   These are low cost subsidiaries founded by charter carriers to provide scheduled LCC flights (TUIfly).
5. **State subsidized competing on price**
   Flights in this category can not be considered as real LCCs due to the fact that they can only maintain their low prices with state subsidy (Emirates).

Relying on the Southwest business model (Table 3), LCCs are able to reduce their operating costs (Table 4) up to 51% of the FSNC's costs (Doganis, 2006, Franke, 2004, Macário, et al., 2007, Pels,

***Table 3** The Original Low Cost Business Model in the Airline Industry as Initiated by Southwest Airlines*

Product Features	
1. Fares/Network	Low, simple and unrestricted fares, high frequencies, point to point, no interlining
2. Distribution	Travel agents and call centers (today internet sales), ticketless
3. In-flight	Single class, high density seating, no meals or free alcoholic drinks, snacks and light beverages can be purchased, no seat assignment
Operating Features	
1. Fleet	Single type, Boeing 737 types, high utilization, 11-12 hours/day
2. Airport	Secondary or uncongested, 20-30 minute turnarounds
3. Sector length	Short, average 400 nautical miles
4. Staff	Competitive wages, profit sharing, high productivity

Source: Pate, Beaumont, 2006

***Table 4** LCC's sources of cost advantage*

			Cost reduction	Cost per seat
Traditional Carrier				100%
Low Cost Carrier				
	Operating advantages			
		Higher seating density	-16	84
		Higher aircraft utilization	-2	82
		Lower flight and cabin crew costs	-3	79
		Use cheaper secondary airports	-4	75
		Outsourcing maintenance/ single aircraft type	-2	73
	Product / service features			
		Minimal station costs and outsourced handling	-7	66
		No free in flight catering, fewer passenger services	-5	61
	Differences in distribution			
		No agents or GDS commissions	-6	55
		Reduces sales/reservation costs	-3	52
	Other advantages			
		Smaller administration and fewer staff/offices	-3	49
Low cost airlines compared to traditional carriers				49%

Source: Macário, et al., 2007

2008). This business model does not expect the ticket sales to be the primary source of profit, instead it relies on other incomes such as surcharges, advertisements, car rental, credit card fees, travel insurances etc. (Berrittella, et al., 2009, Gillen, Lall, 2004, Groß, Schröder, 2007). Besides they lay emphasis on cost cuts, for example, unlike the FSNCs they have lower crew expenses. As the European Cockpit Association (2002) report shows, pilots employed by LCCs earn 28% less than FSNC pilots. Furthermore LCC pilots had 25% more flying time and the whole crew is given less leisure time, while they have to manage more tasks such as flight planning, cleaning the plane, checking fuel levels, etc. (Dobruszkes, 2006).

It is important to mention that not only the low prices establish this unique business strategy. Controlling demand is as important as controlling costs and supplies (Gillen, Gados, 2008). The proper use of yield management is able to earn profit for high class carriers, while the ineffective use of it could make reasonably priced carriers deficient.

The European low-cost networks

After introducing the deregulation processes and the basic characteristics of the low cost model, in this section we examine what changes made to the route networks of the LCCs serving the European market.

Just after the liberalization of the European airspace the first airline, who adopted the low-cost model was Ryanair. Initially there were only four LCCs transporting passengers but already at this time Ryanair and easyJet were outstanding and the routes were UK-centered and showed the dominance of London airports (CAA, 2006). In 1995 LCCs services spread from the UK to the European markets, but until 1999 the impact of low-cost services was still limited. In the beginning LCCs were a regional phenomenon whose operations were mainly restricted to the UK (Franke, 2004). In this point of view a drastic change took place when between 2001 and 2003 the aviation sector suffered a setback[5] and this resulted in great losses in the number of passengers and in the income of FSNCs as well. During the downturn, the low-cost sector grew dramatically in Europe and both FSNCs and charter carriers decided to launch their own low-cost subsidies and more then a dozen new LCCs entered the market (Doganis, 2006).

At the beginning of the year 2004 - the year of the EU's eastern enlargement – the main characteristics of the European LCC networks were

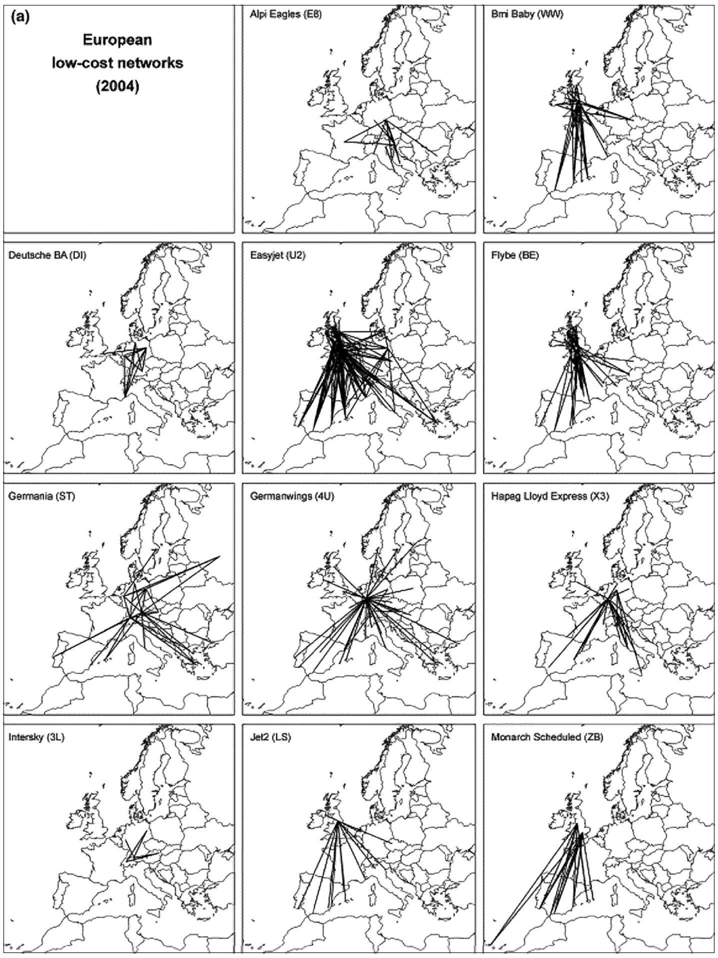

Figure 1 European low-cost networks (a) (2004)
Source: Dobruszkes, 2006

already formed. After the LCC founding boom there were 20 LCCs (Table 7) offering cheap tickets and transporting passengers through a network (Fig. 1-2) which primarily connects cities on short- and middle-haul (there were no intercontinental connections) focusing on the Western European market. In the year of 2004 the average length of a flight was 634 km and 1,4 hours and 70% of the LCC flights operated under 1000 km distance (Dobruszkes, 2006).

The main feature of the European LCCs networks (Fig. 1-2) shows a North to South orientation (from the UK, Germany and the Scandinavian region to the Mediterranean region; Spain, southern France, Italy) because many of the routes were so designed to carry passengers to the main European tourist destinations (e.g. Monarch Scheduled, Sterling European). The West-West routes were dominant this time (Table 6) and only a few West-East routes were available – most of them were offered from British destinations to Prague.

After the 2004 EU expansion a large part of Eastern European region joined the European aviation market and there were no more obstacles to the appearance of LCCs in the eastern mar-

[5] Setback due to 9/11; The war on Iraq and SARS disease

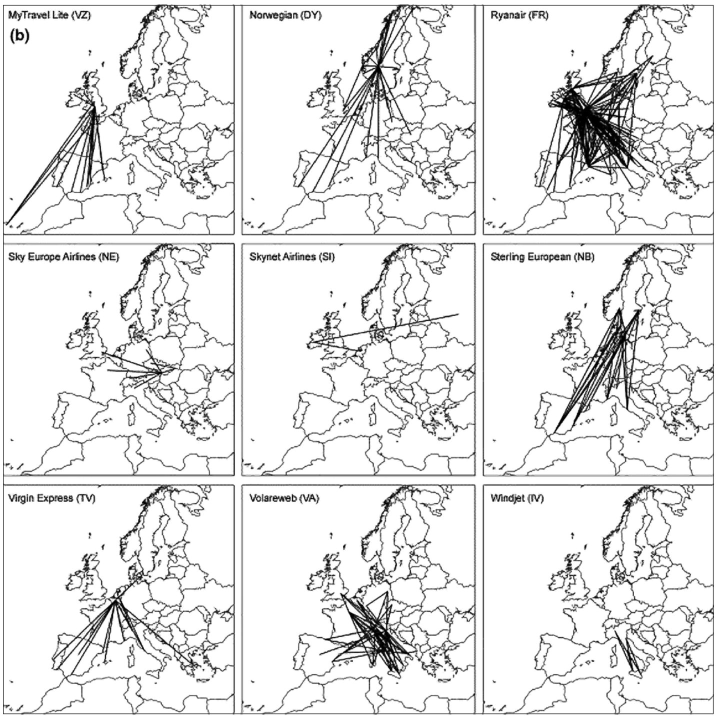

Figure 2 European low-cost networks (b) (2004)
Source: Dobruszkes, 2006

Table 5 *Geographical distribution of the European low-cost supply (millions of seats)*

	January 2004		January 2008	
West – West	7,89	98%	13,4	83%
West – East	0,14	2%	2,13	13%
East – East	0,01	0%	0,07	0%
West – Other	0,03	0%	0,57	4%
Total	8,08	100%	16,17	100%

Source: Dobruszkes, 2009

Table 6 *Geographical distribution of the European low-cost supply (city-pairs)*

	January 2004		January 2008		July 2009	
West – West	512	94%	964	72%	1971	75%
West – East	21	4%	285	21%	399	15%
East – East	2	0%	7	1%	15	1%
West – Other	11	2%	81	6%	241	9%
East - Other					10	0%
Total	546	100%	1336	100%	2636	100%

Source: After Dobruszkes, 2009 modified by the author

kets. The Visegrad Group[6] became East Central Europe's largest market segment (Erdősi, 2008); served not only by western LCCs but also by others (like Wizzair, based in Budapest) emerging within this region primarily as a result of foreign direct investment.

Although the number of LCCs reduced and one part of the market changed (Table 7) - certain carriers went bankrupt (e.g. Sterling), some of them were merged (e.g. Hapag-Lloyd Flug and Hapag-Lloyd Express to TUIfly) and there are newly founded ones (e.g. Wizzair) - the LCC supply shows dynamic development after 2004. Comparing the route networks the situation in 2004 and July of 2009 we can observe three remarkable issues:

1. the number of available seats doubled (Table 5) till 2008
2. the accessible destinations and route supply increased especially (Table 7)
3. the appearance of new West-East routes (Fig. 3-4)

In consequence of this the routes offered by the LCCs were more exclusive, therefore, the geographical distribution of the LCCs became more diverse. Not only on the Western market but on the West-East routes remarkable development can be seen to the extent of gaining 13% share in the European LCC traffic (Table 5). This expansion could be caused by the free flow of labour between the EU Member States and the huge potential market approximately 103,5 million people[7] (www.europa.eu). If instead of the number of available seats we examine the city-pairs connected by LCC flights (Table 6), we find that the numbers of city connections on the West-West routes were four times bigger and on the West-East routes the available city-pairs were twenty times bigger, and also remarkable changes can be observed on the West-Other routes.

As a result of this we can notice that the flight connections are becoming denser, but the formerly established network characteristics did not change significantly but the main features stands out more sharply and were supplemented with the West-East routes.

After examining the LCC networks of July 2009 (Fig. 3-4) we can determine three basic network structures considering geographical distribution.

The first network type shows the North to South flows unambiguously (e.g. Monarch, Transavia, TUIfly). The members of this category are concentrating totally on leisure traffic so their key destinations are the principal cities of the

[6] The Visegrad Group includes Czech Republic, Hungary, Poland and Slovakia
[7] The number includes Bulgaria and Romania which joined the EU in 2007

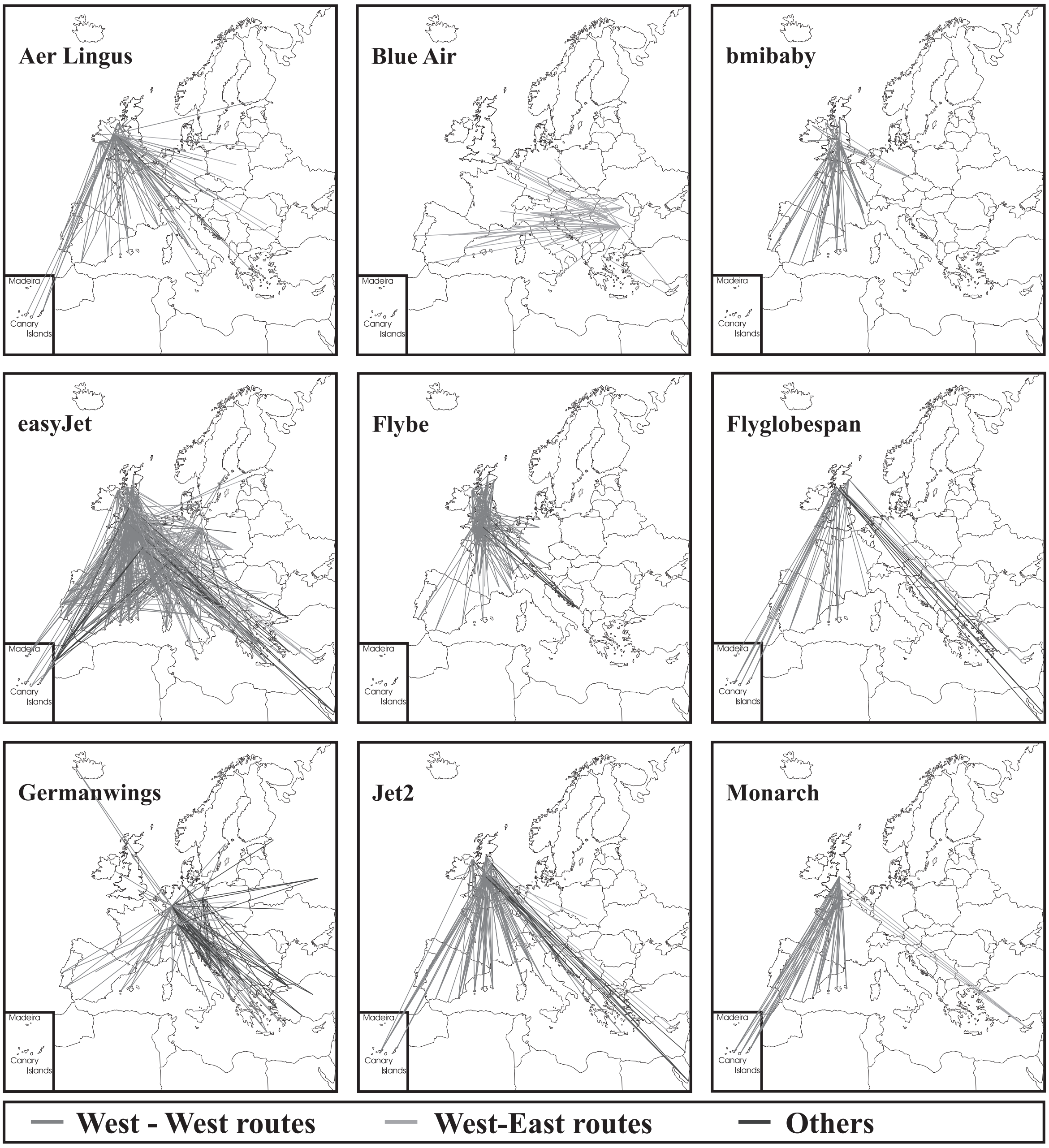

Figure 3 European low-cost networks (a) (July 2009)
Source: edited by author

Mediterranean littoral (e.g. Malaga, Nice, Palma de Mallorca). We can also typify the carriers forming this group, because they are either a subsidiary of a network carrier like bmibaby of British Midland, which focuses mostly on touristic demand, or they are 'hybrid' LCCs which are partly charter carriers - or were former charter carriers like TUIfly – but offer scheduled flights to holiday destinations like Flyglobespan or Monarch.

The second type of network structures represents the West-East flows, which is the most dominant one for the LCCs founded in Eastern Europe especially by Blue Air and Wizzair. Both airline supplies flights to large European metropoles but while Wizzair focuses mostly on the large travel demand between the Polish and English cities, which is induced by new business relations and post-migration flows until then the Romanian LCC primarily concentrates on strict Romanian-Italian and Romanian-Spanish connections, causing a moderate number of Italian destinations - where it can send direct flights not only from the capital but provincial airports (Bacau, Sibiu and Cluj-Napoca) as well.

The third type involves the mixed network structures of Ryanair and easyJet. These two LCCs have an outstanding role in the European market because taking advantage of their first starter position, they have built up an enormous route network (easyJet has almost twice where-

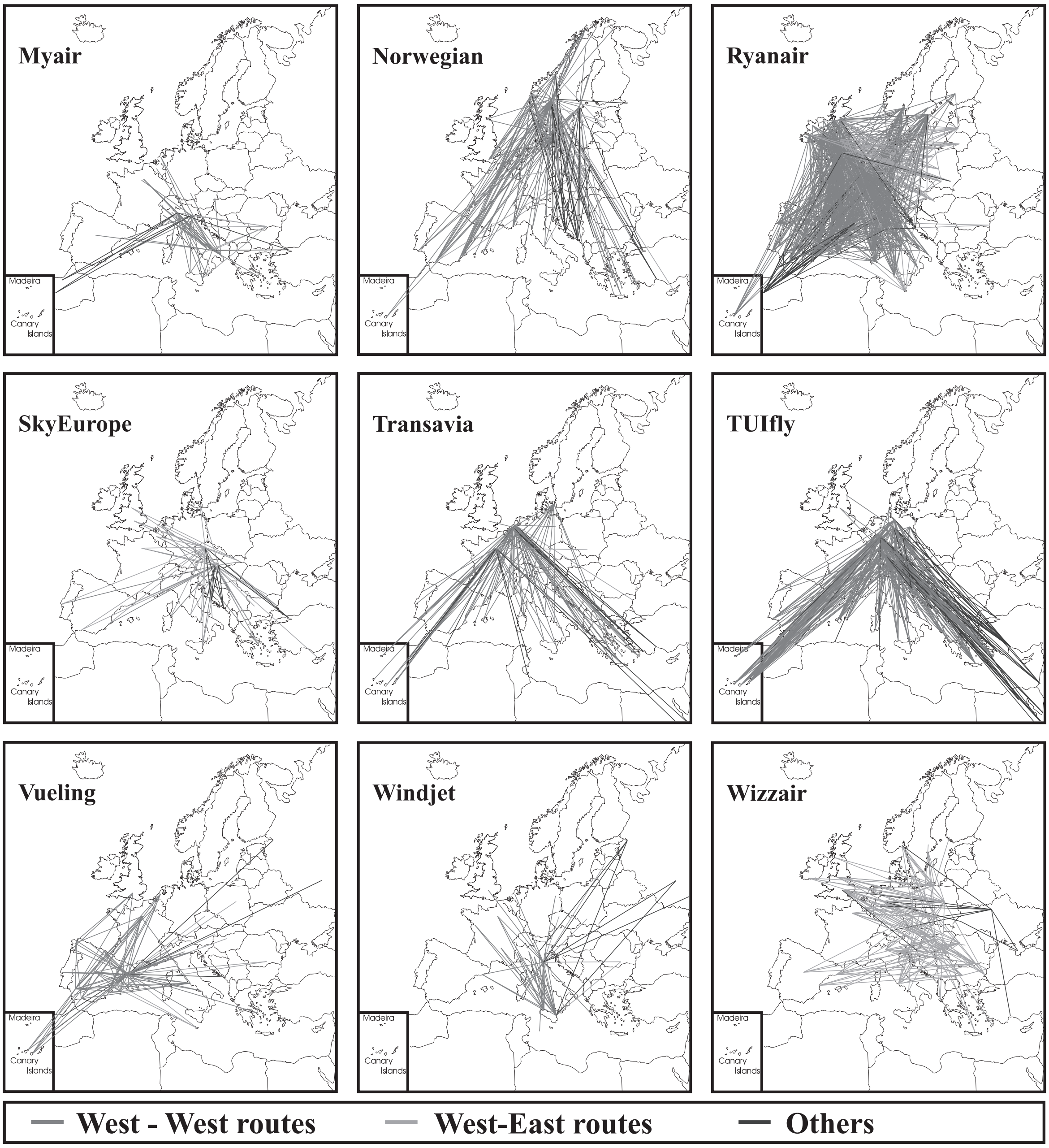

Figure 4 European low-cost networks (b) (July 2009)
Source: edited by author

as Ryanair three times more routes then the third largest airline TUIfly) and they offer travel possibilities for both leisure and business passengers. So the geographical distribution of their destinations is the most multifarious and the route network is the densest among the European LCCs. Their network structures shows not only the North-South orientation but also 'Westwest'[8] flows and a growing number of West-East connections. Former studies did not defined this 'Westwest' category inside the West-West flows, but we found it important to outline that in case of Ryanair and easyJet in the West-West route category not only the north to south orientation is dominant but remarkable 'Westwest' routes can be observed which destinations are not in the Mediterranean region. The main difference between the two route networks of Ryanair and easyJet is the different airport use, which comes from the diverse adoption of the Southwest model. While Ryanair serves secondary airports (e.g. Bergerac, Frankfurt Hahn, Glasgow Prestwick) and in the leisure category focuses more on the passengers who are visiting their second homes, easyJet has a significantly greater proportion of business passengers (CAA, 2006), because it serves not only

[8] At this point by 'Westwest' routes we understand the connections which are in the western part of Europe, but the destinations are not in the Mediterranean area: e.g. Frankfurt-Hahn to Manchester

***Table 7** The features of the European LCC network*

LCCs in 2004	Number of Destinations	Number of Routes	Exclusive Routes* %	LCCs in July 2009	Number of Destinations	Number of Routes	Exclusive Routes* %
Alpi Eagles	9	22	27	Aer Lingus	59	88	69
Bmibaby	24	78	59	Blue Air	34	45	87
Deutsche BA	8	26	31	bmibaby	29	63	51
easyJet	38	238	65	easyJet	110	445	79
Flybe	32	111	77	Flybe	56	162	90
Germania	17	54	15	Flyglobespan	20	36	72
Germanwings	32	66	70	Germanwings	66	121	85
Hapag-Lloyd Express	19	42	86	Jet2	48	105	79
Intersky	5	10	100	Monarch	19	49	41
Jet2	13	23	91	Myair	31	50	82
Monarch Scheduled	11	32	31	Norwegian	75	164	95
MyTravel Lite	14	30	60	Ryanair	145	818	93
Norwegian	21	46	35	Sky Europe	33	57	84
Ryanair	84	292	93	Transavia	68	96	91
SkyEurope	9	16	88	TUIfly	70	272	94
Skynet Airlines	4	6	67	Vueling	44	89	81
Sterling	14	42	33	Windjet	29	46	93
Virgin Express	15	30	23	Wizzair	52	143	88
Volareweb	23	74	38				
Windjet	5	12	33				

**Routes operated without any rival*
Source: After Dobruszkes, 2006 modified by the author

secondary airports, but focuses on primarily large airports (e.g. London Gatwick, Milan Malpensa, Paris Charles de Gaulle) for the convenience of business travelers heading for the city centers (O'Connell, Williams, 2005).

Conclusion

The liberalization of the European market gave new dynamics to the aviation sector and just like elsewhere in the world, LCCs appeared as new market entrants and gained market share in Europe.

LCCs took advantage of the market segment neglected by FSNCs, inducted new demand, and became serious competitors to FSNCs. They introduced many innovations to the aviation industry (e.g. yield management, ticket sales via the Internet, point to point transfer etc.) and due to their new born business model they obtained a considerable market share quickly. Although there is a wide variety within the LCC business model, a few basic characteristics can be pointed out, such as single class, high seat density, no on-board catering, the use of secondary airports, no connections etc.

After the enlargement of the EU in 2004 several Eastern European countries joined Europe's free aviation market. LCCs from this region appeared in the 'Single European Sky' and started competing on the West-East routes with the western LCCs and FSNCs as well.

Answering the question raised in the introduction of the study, we can state, that since the expansion of the EU in 2004, the LCC route network's basic characteristics have not changed significantly, although the route networks became denser and the number of destinations increased. We have identified three dominant network structures dependent on carrier size, adoption rate of the Southwest model (e.g. partly charter, former charter, fully LCC) and the place and time of foundation. In the first network structure the tourism based north to south flows are dominant, the second type represents the West to East network pattern (dominated by eastern founded LCCs) and the third main structure is the mixed network combining the North to South and West to East with the 'Westwest' routes developed by the two largest European LCCs: Ryanair and easyJet.

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