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THE ASPECTS OF LOGISTICS DEVELOPMENT OF AIR TRANSPORT IN HUNGARIAN AIRPORTS

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Abstract: Nowadays in the GDP of Hungary a share more than 10% belongs to logistics, and this rate is increasing [1]. One area of logistics is air transport, which is developing dynamically due to globalization. The increasing number of passengers is correlates with notability of Hungarian tourism, and developing business culture. The volume growth in air transportation is correlates with the increasing export and import of multinational manufacturing and trading companies. This paper presents the domestic development plan possibilities of Hungarian airports, including the impact of airport development on the economic environment. We present the ongoing researches of the Logistics Institute of the University of Miskolc, and the utilization possibilities of the gained experience in Frankfurt Airport.
Keywords: airport infrastructure, air transport, cargo, regional airport

1. Background

The Logistics Institute of the Faculty of Mechanical Engineering and Informatics of the University of Miskolc (Hungary) has been successfully cooperating with the Fraunhofer Institute and the Department of Transport Equipment and Logistics of the University of Dortmund (Germany) since the 1980s, including the program of the development of the air transport system of Frankfurt Airport (Cargo City Süd programme). Staff of the University were involved in an intermediary capacity in 1998-2002 in the development of the cooperation between Ferihegy Airport (Budapest) and Fraport, primarily in cargo development, and in the airport infrastructure development in Hungary (regional airport, standby airport, setting up industrial and business points), in the possible privatization and development programs of the airports in Debrecen, Sármellék, Szentkirályszabadja, Tököl and Szolnok.

In 1998-2002, two members of the Institute as official representatives of Fraport – together with other members of the Institute – assisted cooperation in cargo development. In the recent period the investigation of the luggage transfer system realized as part of the SkyCourt development has offered an opportunity for cooperation.

The experience gained by the Institute in Frankfurt is utilized in the development of cargo and postal systems and it can participate in training a new generation of professionals and in their advanced training. Nowadays the development of regional airports is again topical and the issue of establishing an air cargo center of an Asia – European Union airlift has also arisen, which may further enhance the cooperation opportunities. The paper summarizes the tasks planned in the framework of the cooperation.

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2. The development history of Budapest Ferenc Liszt International Airport [2]

A country with an area of 93,000 square kilometres and a population of 10 million cannot represent a decisive factor in the air transport sector in the globalization process either in passenger transport, or freight transport, or in other services (e.g. express mail). In addition to taking into consideration international tendencies, the Hungarian government insisted on maintaining a national airline and used limited resources for the development of the infrastructure (Terminals 2A and 2B, and parking systems) of the airport in Budapest, Ferihegy (today Liszt Ferenc International Airport). Until 2002 the Air Traffic and Airport Management (Légiforgalmi és Repülőtéri Igazgatóság - LRI) was responsible for the operation of the central airport and for implementing the development projects. The operation of the domestic air network became uneconomic due to the central development programs and the intensive development of the domestic motorway network. With accession to the European Union approaching, the practice of funding the losses of the national airline (MALÉV) from the airport revenues became insupportable. In the course of the preparation of partial privatization, the idea of airport development with a HUB function arose, but the plan became meaningless due to the more intensive development activities of the competitors and slow decision making in Hungary. The plans connected to privatization were mainly linked to infrastructure development (parking lot, terminal construction, postal and cargo system, high-speed rail connection, etc.), the purpose being the construction of a centre serving Central-European air transport and ensuring a high-standard service provided for the domestic airline. Development of the infrastructure of the regional airport network failed to materialize, the ownership conditions (local governments, the army, the state, private companies as maintaining organizations) were continuously changing. However, the development of the regional airports was also begun in the past years as a result of the effects of the changing economic environment, partly with EU funding, partly with encouragement of the companies having a stake in airport development, in some cases with their funding, or by creating ‘a favourable environment’. As a result of the privatisation process lasting until 2004, the company HungaroControl was established for controlling air traffic, and Budapest Airport Zrt was established for operating the airport. In a further stage of the privatisation process 75 % of Budapest Airport Zrt became the property of BAA, then the portion of property was purchased by the German company Hochtief Airport with its financial partners. In 2011-ben the Hungarian portion of the property was also sold. The increase in traffic of Liszt Ferenc International Airport was dynamic in the past 8-10 years until the cessation of MALÉV, as shown by the data on passenger and freight traffic and the number of flights in Table I.

The failure of MALÉV also led to a temporary halting of the developments in the privatization contracts, involving developments of the CARGO, postal distribution centers and the parking system. The increasing demand for conference and hotel infrastructure is also diverted to the prospering airports of the neighboring countries (Vienna, Bratislava, Kosice, and Oradea). We think that relations with the Far East (e.g. electronics parts supply from the Hong Kong center, building partner relations with China, etc.) are of fundamental importance for the domestic development of air transport, joining aviation organizations (e.g. Oneworld), serving the increasing demand for travel and the increase in business turnover.

Table I.

Development of traffic at Liszt Ferenc International Airport until the cessation of MALÉV

Traffic of Budapest Liszt Ferenc International Airport (2002–2011)							
Description		Number of flights, pcs		Number of pass., persons		Mass of goods and postal consignments, tons	
		arrival	departure	arrival	departure	arrival	departure
Scheduled flights							
2002	J–D	30 004	29 999	1 960 227	2 007 163	17 526	14 332
2003	J–D	35 868	36 014	2 177 660	2 209 646	23 459	18 170
2004	J–D	47 349	47 289	2 839 360	2 873 806	29 734	19 356
2005	J–D	54 067	54 038	3 659 233	3 742 318	29 311	22 677
2006	J–D	54 913	54 995	3 772 888	3 866 623	34 755	25 673
2007	J–D	53 992	53 984	3 906 537	4 061 986	39 337	24 888
2008	J–D	51 759	51 815	3 866 452	3 970 951	38 572	19 954
2009	J–D	49 293	49 356	3 772 758	3 886 355	30 952	17 085
2010	J–D	47 148	47 150	3 826 597	3 870 267	35 592	20 194
2011	J–D	48 958	48 964	4 220 284	4 269 455	33 094	19 291
2012	J-D	37 613	37 634	3 983 848	4 042 720	25 271	16 403
2013	J-D	35 776	35 788	4 022 887	4 084 759	25 067	18 311
2014	J-D	37 093	37 082	4 312 866	4 370 141	23 845	16 812

(Source: Central Bureau of Statistics)

3. Development possibilities in developing the conditions for the domestic air passenger and freight traffic

In the 1980s the infrastructure development of Ferihegy airport was given priority, in 1985 Terminal 2A, then in 1998 Terminal 2B was opened, which was constructed for providing high-standard service to international airlines. The two terminals were planned to serve a 9-10 million passenger/year traffic in the long term. With the SkyCourt building inaugurated in 2009, a unified terminal system was constructed, which had an additional area of approximately 28,000 m^2 and became suitable for receiving 10.5 million passengers, satisfying the requirements for security systems and arising from accession to the Schengen Treaty. A visualization of the partially completed development is shown in *Figure 1*.

Major elements of the development include:

- Construction of a central vehicle parking lot,
- Construction of a hotel system serving as a conference center as well,
- Establishing a CARGO base serving the air freight transport, developing the conditions for receiving courier and package/freight transport systems,
- Developing a postal distribution center,
- Developing and improving the operation conditions of technical service companies (e.g. the repair base of Lufthansa-Technik), establishing a high-speed railway for connection with the city center,
- Improving the commercial and service infrastructure at the terminals,
- Implementing an up-to-date luggage transport system,
- Rationalizing ground handling activities.

Figure 1. Visualization of the SkyCourt building
Source: 4D

The development programs were prepared before the bankruptcy of the national airline, MALÉV, thus its occurrence changed the system of objectives set. As a forced measure Terminal 1 was closed, the low cost companies were re-housed at Terminal 2 and the development programs were suspended.

In the recent past the ownership of Budapest Airport has been changed. The company, which operates the airport in these days currently consists of a consortium led by the Alliance AVI GmbH (52,666%), and has other investors from Germany (5%), Canada (20,167%), and Singapore (22,167). In 2013 the Budapest Airport has obtained a net sales revenue of HUF 54, 4 billion, with 950 employees. Since 2007, the owners has been invested HUF 110 billion, and among others with this investment a ground-based instrument approach, called Instrument Landing System (ILs) has been completed (HUF 600 million). After last year's increasing number of passengers (9,16 million), this year the professionals of the airport expect about 9,7 million passengers and a demand of 150000 t/years cargo transport. The current flight utilization is about 79% due to good marketing strategies, and alliances. The aim is start long-term flights to the world biggest cities, like New York, Shanghai, and Beijing and the airport has an incentive success with Emirates.

4. Involvement possibilities of Logistics Institute of the University of Miskolc in the logistics infrastructure development of Liszt Ferenc Airport (Hungary) [4] [5]

On the basis of its relations developed with Frankfurt Airport in the early 2000s and its experience, the Department of Materials Handling and Logistics of the University of Miskolc, offered its involvement in and contribution to concrete development projects to the management of Liszt Ferenc International Airport and established relations with investor groups and local governments interested in and having a stake in the development of regional airports. The simulation of the luggage transport system is completed, and the new tomography system analyze were finished.

Areas of cooperation:

- Simulation operation and capacity testing of the luggage transport system of Liszt Ferenc International Airport in cooperation with EVOPRO development company. The layout of the luggage transport system is shown in *Figure 2*.

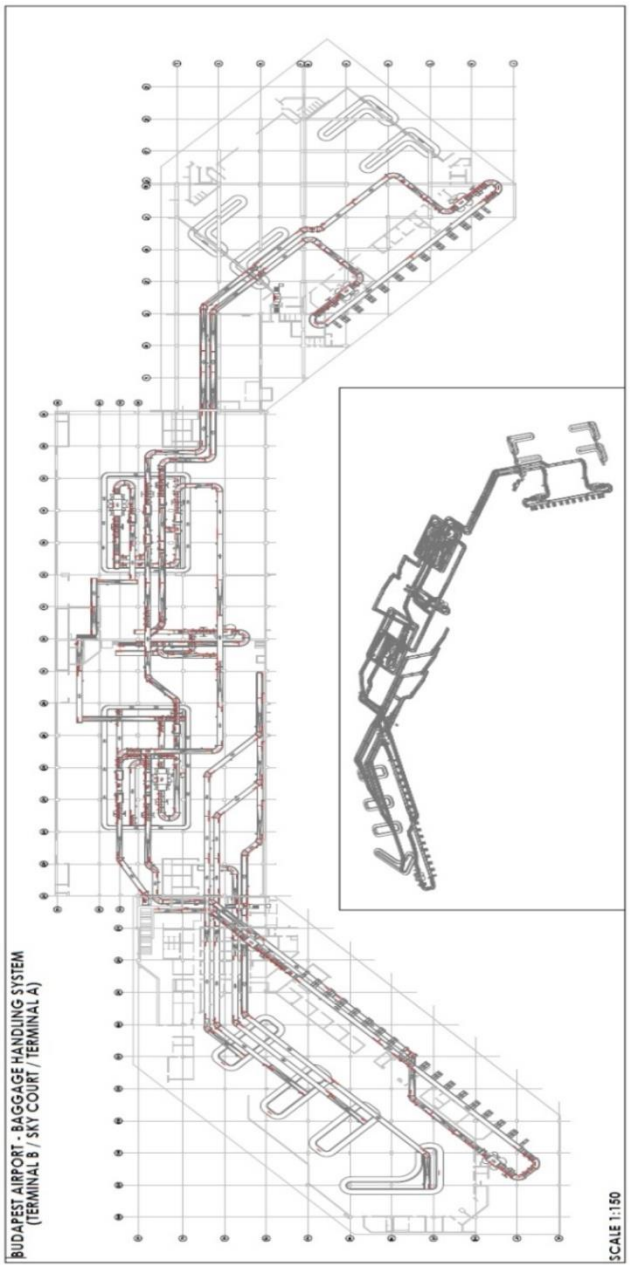

Figure 2. Layout of the luggage transport system

- Objectives of the simulation testing of the luggage transport system are:
  - determining the throughput capacity of the system for a changing timetable structure,
  - determining the loading and unloading times of luggage,
  - determining the capacities of the storage stages,
  - reducing the turn-around cycles of planes by means of luggage handling,
  - time requirement of repeatedly reaching the stationary state in case of malfunction,
  - optimum service for security checks (four levels),
  - investigating the ground handling activities of the united terminal, simulation capacity testing,
- simulation testing of the cargo and postal distribution centers, matching to other logistic systems,
- capacity testing of passenger traffic and parking systems, rationalization of operation,
- harmonizing the operation of market players interested in the development of regional airports, preparing needs analyses and prognoses, investigating intermodal possibilities,
- cooperation in specialist fields of training professionals, involvement of practicing professionals in education and in consultancy for theses.

5. Development aspects of regional airports [3][7]

In Hungary, there are several possible motivations to develop an airport. These are (based on our opinions):

- Usually the existing airport infrastructure is mostly dilapidated and anachronistic, and there is good chance to get Europen Union support, or some pork-barrel, to develop.
- It has positive impact for regional economic development too (tourism, industrial park development etc.).
- An airport development is a good chance to fulfilling the role of regional logistics center.
- Providing a reserve airport function.

For the last 25 years, the disposal of contaminated regional airport has been continuously in processed. Due to the hard transparency of ownership structures these processes are mostly untraceable and because of this, impeachments are totally fell away. The disposal works has been met about a share of 60%, but the problems resulting from the disposal of the demolished buildings are still not solved.

As one of the results of the change of regime in Hungary in 1990, the regional airports performing mostly military functions up till then became visible, and the technical background of the operation and the considerable environmental pollution resulting from the operation became public knowledge. Owners and maintainers of the regional airports are:

- the state,
- local government (settlement, region),

- the army,
- associations, civil organizations.

Fraport has a division, whose main function is the development of "small airports". In this division the development plans of Frankfurt-Hahn Airport were implemented, and nowadays it is a low cost airport, which implemented significant cargo developments (e.g.: an 80000 square meters warehouse with attendant infrastructure). In these days this is a reserve airport of Frankfurt Airport.

The colleges from Frankfurt have been analyzed the opportunities and makings of Hungarian regional airports. Thanks to the last few years unfriendly and unpredictable investment environment they have been receded from any Hungarian airport investment and tied up their stock into Cuban, Malaysian, and Bulgarian airports. The regional airport development wills are subsists in Hungary, and due to globalization these wills are getting more important.

The coverages of regional airports (bearing on traffic) and their economic effects were analyzed in a PhD dissertation "Economic Analysis of the Development of Regional Airports" by Tibor Tiboldi in detail [6]. In his dissertation he defined impact zones of regional airports in neighbor countries which are effects on Hungarian airport development plans. It is without doubt that the development plan of regional airports in Hungary is decisively influenced by the regional development plans of the neighboring countries as well. *Figure 3* shows their areas of impact.

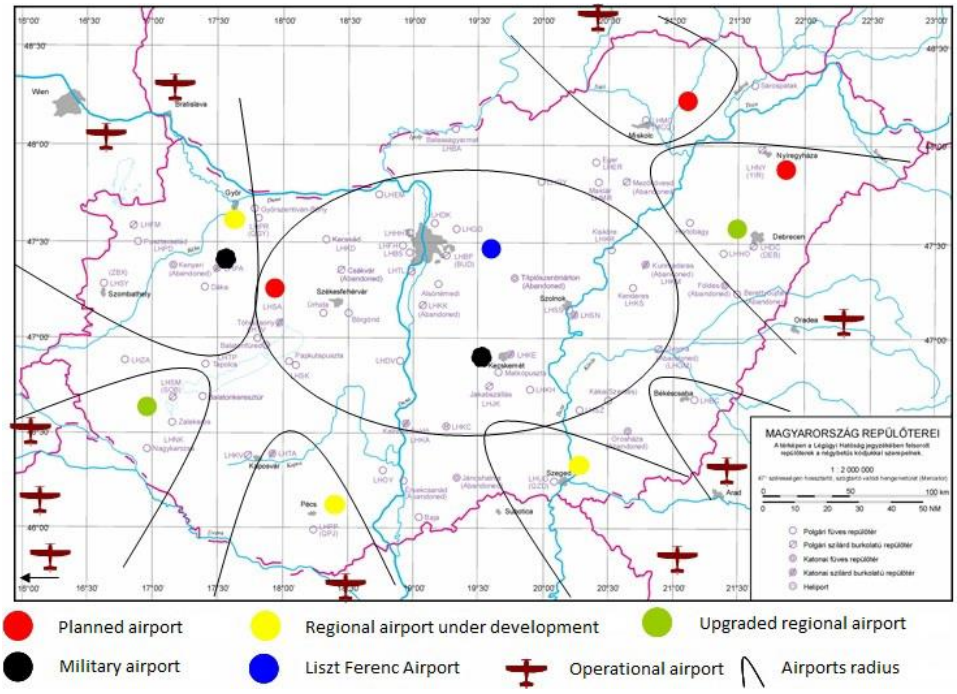

Figure 3. Regional airport impact zones

Regional airports in general fall into categories „C" and "D" (Table II.), which amount to 20 % of the European passenger traffic, approximately 120 airports belong to these categories. Using the same criteria like Tiboldi, we analyzed the possible rivals of Hévíz-Balaton Airport, and we summarized it in Table III.

Table II.

Regional airport categories

Category	"A" Large community airports	"B" National airports	"C" Large regional airports	"D" Small regional airports
Annual passenger volume	> 10 million	Between 5 and 10 million	Between 1 and 5 million	< 1 million
Number in Europe	20	15	57	67
Total share in European air traffic	65%	14%	17%	4%

Table III.

The rivals of Hévíz-Balaton Airport

Airport	Function	Elevation	Runway	Number of passengers	Mass of goods, tons
Ljubljana Jože Pučnik Airport (IATA: LJU, ICAO: LJLJ)	public airport	388m	2000m	1.198.911	17.031
Zagreb International Airport (IATA: ZAG, ICAO: LDZA)	public airport	108m	3252	2.430.971	10.065
Graz Airport (IATA: GRZ, ICAO: LOWG)	public airport	340m	3000	900.000	9.652
Győr-Pér Aiport (IATA: QGY, ICAO: LHPR)	public airport	129m	2030	30.000	89.5

After a transition of 20 years, tendencies have become apparent which may direct the attention to pursuing regional airport development. Further motivation for the development may include the following factors:

- increase in regional tourism (including health tourism), increase in interest from abroad, increasing tourism to thermal water bases,
- increase in the number of groups with a demand for air transport (e.g. foreign nationals pursuing studies in Hungary),
- increase in tourism to abroad (charter flights),
- increase in business volume (JIT parts supply, management mobility, etc.),
- developing local economy and services requiring air transport,
- intensification of the activities of low cost airlines,
- performing standby airport function.

It is becoming clearer and clearer that the motivating factors listed assist in the accelerating development programs of the airports in Debrecen, Sármellék, and Győr, which are facing a promising boost if their capital attracting facilities can be improved. If the China airlift is implemented, it may mean considerable industrial park development near the relevant logistics center. Exploring the logistic connections and rationalizing the transport requirements, their harmonization with other transport systems will require the development of the professional background and that of high-level coordination. The

business plans of the regional airports are not public, their coordinated development may take place basically based on the market, but the involvement of the state is not indispensable either, beyond the military utilization (diplomacy, foreign relations, etc.)
In 2004 the government of Hungary pronounced the airport of Debrecen (Debrecen International Airport) and Sármellék (Hévíz-Balaton Airport) into dual-use (civilian/military) airports, and made up development plans. The Logistics Institute of the University of Miskolc created a feasibility study in order to boost tourism in the Balaton region based on the predictable business and tourism passenger traffic. The terminal of Hévíz-Balaton Airport can be seen on *Figure 4*.

Figure 4. The terminal of Hévíz-Balaton Airport

The International Airport of Debrecen *(Figure 5)* count on cargo transport, not only passengers, and their new railway container terminal opens the door to build a Far-East airlift. Nowadays is still possible the realization of a Chinese airlift with a connecting industrial park.

Figure 5. The terminal of Debrecen International Airport

It's complicate to measure the multiplicative effects of airport development on the economics, for an example we cite representative data of Fraport investment, and its effects on *Figure 6*.

We have to note, that the airport of Győr-Pér, the company of Audi made it profitable with their supplier strategies. In Hungary more cities integrated airport development ideas into their city development plans as an economic expansion factor. These biggest objections are the predictable low passenger cargo demands, and the competitiveness with other transport options (Road, railway). Some other prizes also hinder these investments, like parking fees, landing fee, or aircraft catering. The Institute of Logistics has the methodologies, which supports to find the best solution to develop airports (predictions based on economic and social data).

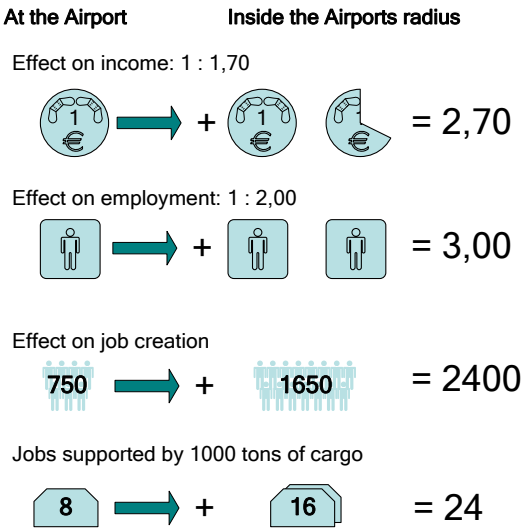

Figure 6. Multiplicative effects of airport investment on a regional level

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Note

Béla Mang university professor as a former Hungarian representative Fraport has a non-disclosure agreement with the company, which is valid until 2017. Due to this some data cannot be published in this paper.

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