CETRA 2012

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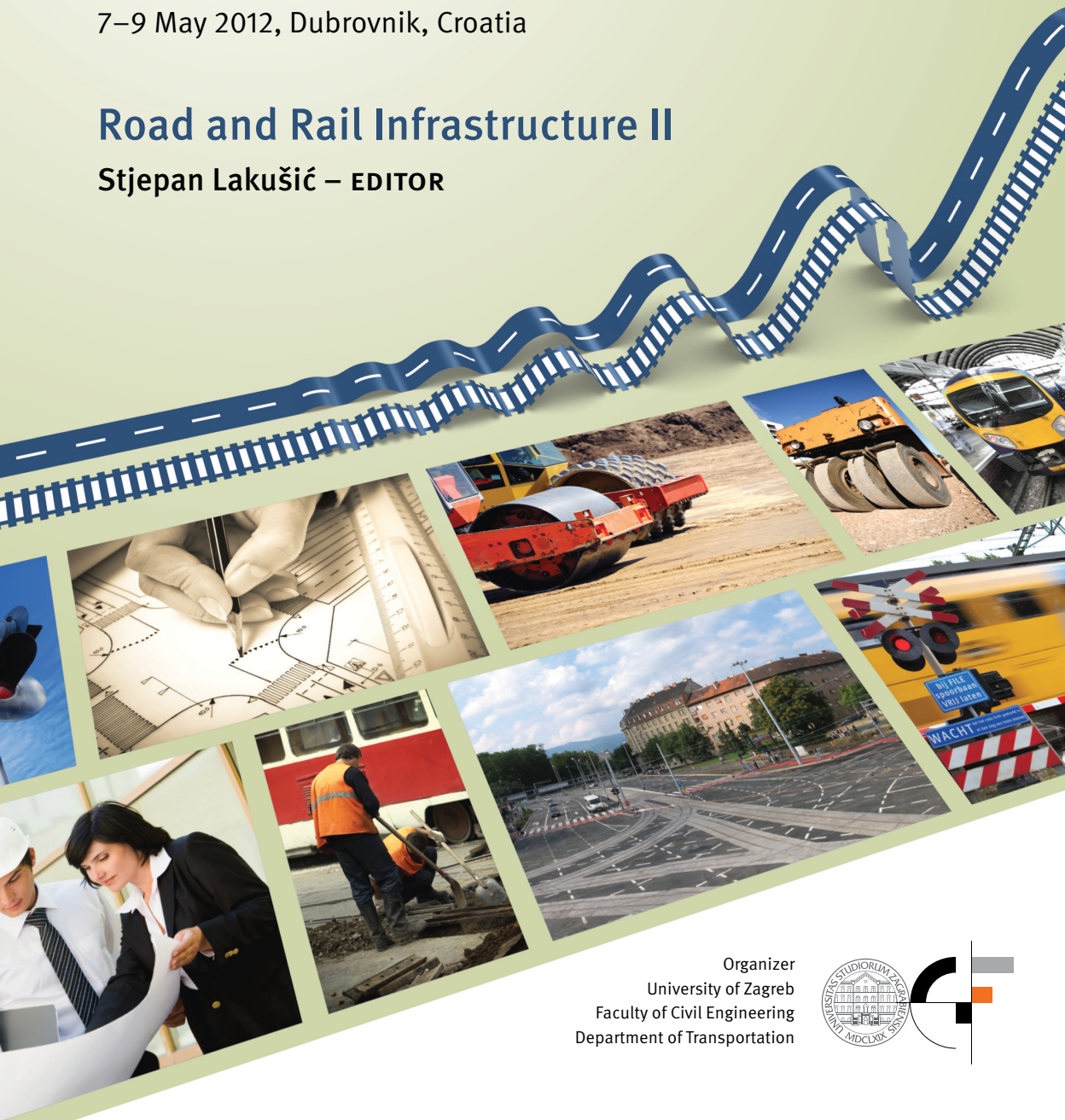
7–9 May 2012, Dubrovnik, Croatia

Road and Rail Infrastructure II

Stjepan Lakušić – EDITOR



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EDITOR
Stjepan Lakušić
Department of Transportation
Faculty of Civil Engineering
University of Zagreb
Zagreb, Croatia

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AIRPORT ACCESS INFRASTRUCTURE CRITICAL ISSUE OF THE INTERMODAL CHAIN

Antonín Kazda
University of Žilina, Air Transport Department, Slovakia

Abstract

Attractiveness of an airport depends not only on the number of routes offered but also on the airport access infrastructure and airport terminal capacity. The expected passenger growth in 2030+ time horizon is tremendous and it is not only necessary to fly them, but also to get all passengers, meeters and greeters and staff to and from the airports. Quality of airport access, the trip duration and the reliability of the access mode influence the passenger decisions for particular airport selection but also airport arrivals and dwell times in the terminal which can have a dramatic effect on airport operators, their retail models and ultimately their revenue. With respect to the passenger typology it is important to focus also on the low cost carriers segment which will represent 30% of the whole market in 2026 in Europe. The ambition of most European airports is to increase share of public transport in the airport access modes to reduce large environmental footprint resulting from share of drop off 'kiss and fly' traffic with negative impact on the environment and the access road capacity. However, is it possible to increase attractiveness of intermodal transport in the future? What are the preferences of different categories of passengers? Is it possible that dedicated rail services could be attractive also for the price sensitive segment of low cost passengers? Results from research at Prague, Brno and Bratislava airports but also from other sources give answers to these questions.

1 Introduction

The simple, smooth growth curves that are often seen in air traffic forecasts can encourage us to plan simplistically, but demand is not homogenous in all world regions and traffic growth is not uniform. The dips in growth of passenger growth are related to the oil crises in 70's and 80's, the recovery in the following years, the drop after 11 September 2001 and growth restored thereafter [6]. However, air transport development is intrinsically linked to economic growth and the long term average records about 5% increase per year over 20 years [4] despite different crises and other short–term market depressions.

The analysis of future trends in all world regions shows that Asia and North America will be together with Europe dominating the world air transport market after 2025. According to Boeing: Current Market Outlook 2011–2030 the world GDP is expected to grow by 3.1% annually between 2011 and 2028. However, it will not be equally distributed around the whole world. For example, Chinese GDP is now expected to grow by 10.4% and Indian GDP by 8.4% annually by 2028 [1]. This will result in very strong growth of air transport in Asia in the next two decades comparable with that in the West, which will result in the doubling of air traffic every 20 years.

According to [2] after examining the more than 160 traffic flows the projected annual growth expressed in revenue passenger kilometres (RPK) of 4.84% (rounded to 4.8%) from 2010 to 2030 is expected. Similary according to [4] growth of 5.1% annually for the same period is expected.

Passenger numbers will increase but fortunately, for the runway and airspace capacity, the number of aircraft movements will not rise as fast because of higher load factors, less frequency and new bigger aircraft.
Short haul transport will be increasingly characterised by low cost carriers. Airbus expects low cost carriers to continue to increase their global short–haul traffic market share, from 23% today, up to 29% by 2020 and 34% by 2030. Regionally, some short–haul markets such as the intra Western Europe or domestic ASEAN for instance are expected to have greater low cost market presence, potentially taking a 60% share of the short–haul market on these flows by 2030 [2].
This market will grow on average by more than 6% annually [4] and the market share (in terms of seats) of Low Cost Carriers (LCC) will achieve high values by 2026 [2] see Table 1.

Table 1 Market share of the Low Cost Carriers in 2026

Region	Market share [%]
Europe	30
North America	23
Latin America	20
Asia	12

2 Airport access and airport terminal capacity

Doubling the number of passengers by 2028 does not necessarily mean that duplicating infrastructure will be required to accommodate the demand [19]. With respect to airside and airspace capacity, implementation of new control tools and management measures will contribute considerably to better utilisation of existing infrastructure e.g. CDM, AMAN, DMAN, ACE. Despite the absence of essential investments such as new runways or terminal buildings, the Europe's most congested airports still keep their ability to accommodate the growing demand. Needless to say these airports have been considered as saturated for years [20].
In Europe there are measures proposed to increase and better utilize the air transport capacities.
The expected passenger growth in 2030+ time horizon is tremendous and it is not only necessary to fly them, but also to get all passengers, meeters and greeters and staff to and from the airports. All of above listed methods for air transport capacity enhancement consider air transport as an isolated and independent transportation system and the problems of airport terminals and airport ground access are being underestimated [19].
Many times airport managers object that ground transportation to and from the airport is not necessarily their business. They are right. But the quality of airport access, the trip duration and the reliability of the access mode influence the passenger decisions for particular airport selection but also airport arrivals and dwell times in the terminal which can have a dramatic effect on airport operators, their retail models and ultimately their revenue. The operation of a passenger terminal partly depends on the airport ground access, as the reliability of the access transport and the length of passenger journey affects the amount of time that the departing passenger spends in the terminal. Short dwell times in terminals require only few facilities while airport terminals where longer dwell times are expected must provide a high level of comfort and convenience. Ashford, Stanton and Moore [3] identified length of access time and reliability of access time as two of the most important factors influencing the departing dwell times.
We can approximate the time necessary for a particular access journey to an airport as a random variable that is normally distributed about its mean value. The real arrival earliness pattern of passengers differs from the normal distribution. The distribution for simulation of

departing passenger flows was researched and described by Mr. Maťaš and Dr. Štefánik who are the authors of the AGAP – Airport Ground Access and Egress Passenger Flow model. It is reasonable to assume that the variance of the individual journey time about the mean is in some way proportional to the mean.
The real arrival earliness distribution of passengers differs from the normal distribution and it is unique for each airport and mode of transport (Figure 1)[22].
The long queues at check–in counters and at security checkpoints are not the only issues the airport operators have to deal with. A large percentage of private vehicle access trips at many airports lead to congestion of airport access roads and car parks. Moreover, a high share of individual car access trips has a negative impact on the environment. At many airports the ground trips of private cars associated with the airport operation generate a greater share of air pollution than the aircraft movements [9]. The kiss–and–fly transport generates twice the number of car journeys compared with the passenger who uses an airport car park. In 2005, 27% of air travellers through Gatwick were driven to the airport in cars belonging to friends or family.

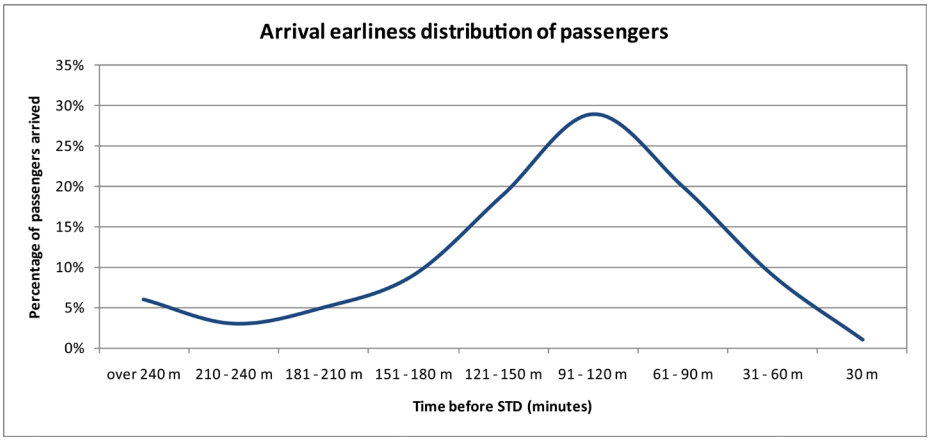

Figure 1 Arrival earliness distribution of passengers at LZIB [19] (Source: Bratislava M.R. Štefánik Airport passenger surveys 2003, 2004 and 2007)

3 Ground transportation and revenue issues

Airport access improvement leads to a stronger position of an airport on a market and to an enlargement of the airport catchment area. An increase in an airport's attractiveness also results in airport throughput development. On the other hand, access traffic improvement leads to a reduction of passenger dwell times which may imply limited time for shopping and spending in catering facilities which can affect airport non–aeronautical revenue. An increase of public transportation share may result in a decrease of individual car journeys and a car park income decrease.

4 Time and dedicated services

Our most valuable possession is not material wealth, it is our time – how we spend the limited hours of our lives [10]. Time is irrespective of the social status or the amount of cash. It is claimed that: 'People spend somewhat more than one hour per day travelling on average (i.e. travel time budget), despite widely differing transportation infrastructures, geographies, cultures and per capita income levels' [17]. The notion that a travel time budget is stable over time and space and independent of modes of travel is open to debate.
Mankind becomes wealthier. Most people feel that we have less time and it is only a reflection of reality. Life is more dynamic. As a consequence, we are using faster means of transport to increase our range in allowed time limits and travel time values tend to increase. As any transfer in a transportation chain implies time penalties, direct and faster services tend to be more expensive but also more preferable by passengers with higher income and social status. As an example, the transport between the Kuala Lumpur International Airport (KLIA) and the Kuala Lumpur city could be mentioned. When using KLIA Ekspres, the journey takes 28 minutes while the journey with KLIA Transit (commuter service with three quick stops at intermediate stations) takes 35 minutes. The ridership split between Ekspres/Transit is 36:64, while the revenue split is approximately 70:30, indicating the much higher yields of the Ekspres.
This raises the question – who could be the customers of direct – dedicated rail services? Logically most can come from business passengers because of the higher price of a direct service. This is not always true. Simply there are always passengers who will probably never ever use public transport and will keep driving a car (at the start of his/her journey) and/or taking a taxi in his/her destination or at both ends of journey. For a non–resident business traveller arriving for the first time to an unknown airport it is easier and more convenient to take a taxi and avoid a transfer in the city centre station or city terminal. On the way back, if she/he boards a taxi in front of the hotel it is likely that she/he will go directly to the airport or without a return ticket may at least vary the return to the airport. Vienna airport in cooperation with Vienna Tourist Information ventured to ease the city centre transfer problem by offering a single CAT – CAB ticket, with preferential tariff with internet booking. It could be used for special taxi transportation between a hotel and CAT train station and it also includes the train ticket between city centre and the airport.

5 Dedicated rail services and Low Cost Passengers preferences

The other question is if direct train services are also being used by the low cost passengers. According to [15] the typical LCC passenger is extremely price sensitive, intelligent and young. Conventional evaluation practices tend to ignore transport qualitative factors, assigning the same time value regardless of travel conditions, and so they undervalue service improvements that increase comfort and convenience.
Discretionary passengers (people who have the option of driving) tend to be particularly sensitive to service quality. Increase of a public transport quality often increase transit ridership and reduce automobile traffic [10]. Numerous studies have quantified and monetized (measured in monetary units) travel time costs by evaluating how travellers respond when faced with a trade–off between time and money, for example, when offered an option to pay extra for a faster trip ([13], [21], [11]). All factors of transport quality and comfort (level of service), waiting conditions, crowding, transfer, reliability, frequency, safety, security, real time travel information, speed and even aesthetics could be evaluated as they affect passenger decision for particular mode of transport.
The LCC passengers are extremely price sensitive, many times it is their first time in a particular location and thus they are unfamiliar with the usually complex local transportation system. On the other hand, LCC passengers would not risk missing a flight by choosing an access transport with a low reliability. The typical LCC point–to–point operation normally offers, with exception

of very dense markets, just one flight a day [23]. When missing a flight, the low cost passenger may need to bear the costs of an extra night accommodation and certainly will pay high price for a new last minute ticket. However, these issues affect outbound passengers only. Some passengers can look for cheaper alternatives after the inbound flights [24].
Onward travel (after arriving at destination) is mostly not demand derived and can be influenced. On arrival passengers usually have more options on how to get downtown. According to Stansted Express experience the choice of which type of onward travel can be controlled and influenced back at the time of flight booking (home/internet/ travel agent) but also at the airport before departure, during flight by onboard sales and finally on arrival. In the case of Stansted Express targeted marketing partially shifted passenger behaviour. This research, customer insight, and marketing communication and promotion with online links from airlines to Rail were major influencers in the incremental mode share improvements for Stansted Express during 2006–2008.
Results of our PhD research conducted on three European airports show that the most important factors for increasing public transport attractiveness for air passengers against car usage are mainly:
· Simple transfer between transport modes with minimum walking distances
· Possibility of single ticket usage
· Connections reliability

Considering all the above mentioned factors, LCC passengers may decide to choose direct train services to the airport if we offer him/her a product with high time values improvements. Fast, uncongested, clean, reliable, safe, secure, easy to plan, easy to use, easy to find, with a station directly at the airport terminal. The second part of the success is the easiness of booking, buying the ticket via Internet but also other selling channels in cooperation with airlines (on board sales) and the airport.

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