

Potential and Limitations of Air-Rail Links

A Short Overview

Airports have always been multi-modal interchange nodes but their role has dramatically changed in the course of air transport liberalisation. The air transport sector witnessed an average annual growth of 7.9 % within the European Union between 1993 and 2000. As more and more airports get congested, airport operators and airlines are increasingly turning their attention to connecting rail links in a quest to relieve airside congestion, which negatively affects the quality of service, especially in terms of total travel time. Therefore, air-rail links can be regarded as a crucial tool for managing long-term airport capacity. However, promoting air-rail links can also be an instrument for decreasing airport ground access congestion and to improve the ground access time reliability. More than 70 airports worldwide now have some form of air-rail link, and around 140 more are in the planning process. Various types of air-rail links, such as tramways, light rail, underground and heavy rail connections, are currently operated world-wide.

By Andreas Eichinger/Andreas Knorr*

Air-rail links can, first of all, be classified into their different intended purposes and can either be built to connect passenger or freight transport. Furthermore, passenger air-rail links can be classified according to the quality of the rail interconnection, i.e. the rail link could provide local connections only or long-distance connections as well. Long-distance services can either be provided by regular long-distance trains or high-speed trains. Local services, by contrast, can be provided by regular local trains, underground trains or tramway and are often an extension of existing local rail services. It should be noted, in this context, that different airports require different kinds of air-rail links. Airports often generate a considerable volume of ground transport (passengers, employees and meeters/greeters), so the construction of air-rail links will only be profitable if a critical mass has been reached.

Furthermore, it is important to note that, from the passengers' perspectives, the flight segment of their jour-

neys is in itself only one leg of the entire itinerary. This means that passengers must use other modes of transport to get to the airport in the first place and also to continue to their final destination. As a result, they have a modal choice for these feeder portions of their trips. Therefore, rail links not only have to meet the requirements and needs of potential passengers better than alternative ground transport modes in order to be able to gain a significant market share. Even more important, potential passengers also have to be aware of their modal alternatives.

The most important determinants of demand for passenger rail services

are price, journey time, reliability and frequency, with rail services competing in any of these dimensions with competing modes of transport. However, with respect to intercity air-rail links, two more determinants come into play: their capacity to provide 'seamless travel', i.e. a high level of integration into complex intermodal itineraries, and the availability of incentives such as frequent flyer miles.

The preferences and requirements of different groups of (actual as well as potential) air-rail link users differ considerably with respect to their willingness to pay and to the service quality they desire. However, service reliability plays a major role. Some operators of air-rail links offer reliability guarantees, e.g. if Heathrow Express trains are delayed by more than 15 minutes, the operator will refund the fare.

If airlines intend to substitute intercity air-rail links for short-haul flights, then it is not enough to offer connecting air-rail links on a codeshare basis and fully integrate them into the reservation systems to lower passengers' transaction costs and to increase their awareness of the availability of those services.

Even more important, at least for leisure travellers, intercity air-rail link users should be offered some form of early baggage check-in service. However, the provision of in- and out-bound baggage transfer raises tricky security issues, and at the time of writing, this was provided in Switzerland only.

Integration of the air-rail link into a

comprehensive rail network, which serves a large catchment area, enables it to serve a larger potential market and provides passengers with more travel opportunities.



So far, the advent of high-speed rail travel in the past twenty years in Europe has had a significantly negative impact on the economics of some short-haul flights over a distance of up to around 600 kilometres. For example, the introduction of the German ICE-services between Hanover and Frankfurt or the introduction of Eurostar-services between Paris, London and Brussels has led to a substantial decline in passenger numbers for airlines on these routes. Some



city-pairs, such as Hanover-Berlin and Hanover-Nuremberg, have even completely been abandoned by airlines. And in France, that pioneered high-speed rail service in Europe in the late 1970s, important city-pairs, such as Paris-Lyon and Paris-Marseilles, have particularly been affected. However, the full potential of high-speed trains as an airline competitor is as yet unclear. According to Lufthansa analyses, any air service within a time window of one hour can expect to experience fierce competition from high-speed trains. If the train trip does not take longer than two hours, the train fare is less than the flight's fare and the offered frequency at least the same. Other studies point out that rail services are a competitive mode of transport over distances that may be covered in a maximum of three hours.

This assessment, as well as the empirical evidence at hand so far, are the result of the fact that, albeit only for travel between city centres, rail services enjoy a considerable competitive (i.e. time) advantage, as main rail stations are, unlike most airports, generally located in the heart of the city. In other words, a time-consuming and costly transfer from an out-of-town airport to the final inner-city destination of the journey is not

needed. Moreover, aircraft use relatively more fuel than on longer flights over short distances, because a large share of fuel is consumed during take-off, i.e. the operation of short-haul flights usually is more expensive per route mile than of the

operation of long-haul flights. Furthermore, landing fees as well as uncompetitive total trip times - including transfers to and from the airports, check-in time, security controls -, typically turn alternative transport modes into more attractive options. Airlines, as a result, often do not offer direct point-to-point flights below 300 kilometres because their cost structure and the competitive advantages of the other land-based modes do not allow them to make a sufficient profit on very short routes. However, they still offer feeder flights over this distance, which are usually operated by their regional affiliates using small turboprop aircraft or regional jets, for passengers connecting to longer international or even intercontinental flights. At least at those airports that are directly connected to the intercity rail network, closer cooperation, especially in the form of code-sharing arrangements between airlines and railways, should, generally speaking, give rise to a win-win situation, because of the substantial network economies that could be achieved through this type of air-rail link. This is especially true in Europe, where both extensive inter-city and regional rail networks do exist and some of the main airports are already connected to them.

If the concerned domestic market is largely closed to foreign airlines because of the still highly protectionist regulations governing international air transport (in particular lacking cabotage rights), typically preventing them from servicing more than one or two airports in this market, their catchment areas and, ultimately, their intramodal competition can indirectly be increased by signing a code-sharing agreement with domestic railway companies. Moreover, competition among airports is also affected to a certain degree by the existence of air rail

links to some of them, but not to others. In particular, as most regional airports have to do without them - local access lines ignored - the already dominant position of hub airports is likely to be reinforced.

With the rise of low-cost carriers, the airline industry is undergoing the most significant transformation in its entire history. Most importantly, but so far completely overlooked by analysts and researchers alike, low-cost carriers do not incur any costs for feeding traffic. While offering (frequently unprofitable) feeder flights from smaller airports into their hubs still is a crucial pillar of the traditional network carriers' business model, low-cost carriers have managed to completely shift these costs to their passengers in return for their much lower base fares. It is obvious that improved air-rail links - if they do meet all requirements stipulated earlier in this paper - would be a very effective tool for the traditional network carriers to maintain, or even expand their own catchment areas at much lower costs compared to maintaining much costlier feeder flights while at the same time freeing valuable slots for more profitable routes. At least for distances below 300 kilometres, a reduced overall trip time would be another advantage from the passengers' perspective.

Air-rail links can also improve ground access of airport, if the respective airport suffers from road congestion. Furthermore, air-rail links can be used as a tool to increase an airport's catchment area. In Europe, they often serve as feeder connections to long-haul flights, much as short-haul flights connect to

long-haul flights in the United States. The prerequisite is high-quality ground access, which is reliable and comfortable, as well as an important factor in customer satisfaction with the overall journey. However, the substantial investments necessary for constructing dedicated air-rail links, especially when the rail link has to

be integrated into an existing airport, have to be considered. A thorough cost-benefit analysis is an essential tool in order to establish the economics of such an air-rail link. Obviously, there is a business case for air-rail links only at major airports or, in the case of smaller facilities, if an already existing line could be extended at little expense. Finally, a significant lack of customer awareness could inhibit the success of air-rail links. This gap in perception, particularly by car users, means that on the one hand the cost of public transport journeys - including the opportunity cost of travel time - is usually overestimated, while on the other hand, the speed of public transport journeys is usually underestimated. If the aforementioned critical success factors are met and obeyed, air-rail links will indeed provide an attractive modal choice.



Note: The full paper is available online at www.iwim.uni-bremen.de

- * both: Deutsche Hochschule für Verwaltungswissenschaften Speyer (German University of Administrative Sciences Speyer), Chair of Economics, National and International Economic Policy, PO Box 1409, D-67346 Speyer, Germany; Tel.: +49-6232-654-352; Fax: +49-6232-654-256; Email: eichinger@dhv-speyer.de and knorr@dhv-speyer.de.
- i. Tronet (2003): International Air Transport of Passengers 1993-2000. *Statistics in Focus*. (2), p. 2.
- ii. *Doke, D.D./Moxon, J.* (2000): Airways railroaded. In: *Flight International*. 15-21 August 2000, p. 25.
- iii. For a detailed overview of air-rail links in Germany see *Bernhardt, H.* (2000): *Schiienenanbindung der deutschen Flughäfen*, Stuttgart.
- iv. See *Cokasova* (2003) : Air Rail Intermodality from Passenger Perspective [online]. Proceedings of the 19th Dresden Conference on Traffic and Transportation Science, Dresden, September 22-23th, 2003. Available from: http://vwisb7.vkw.tu-dresden.de/TrafficForum/vwt_2003/beitraege/VWT19proceedings_contribution_103.1-103.17.pdf [Accessed 31 August 2004] and *Vinois* (2003): High-Speed Rail in Europe – “Facing new challenges” [online]. Available from: http://www.railtec.de/files/ph_galerie/files/Vinoisrailtec2003.pdf [Accessed 31 August 2004].
- v. In Japan, courier services that provide for baggage transfer to hotels and homes immediately after arrival have long been extremely popular among travellers.
- vi. See European Commission (1996): Interaction Between High Speed and Air Passenger Transport. Interim Report [online], Brussels, April 1996. Available from: <http://www.cordis.lu/cost-transport/src/pub-318.htm> and *Cokasova* (2003), p. 14.
- vii. The railway's share in the London-Brussels market increased from 24 % to 52 % between 1994 and 2001, and for London-Paris it has almost reached 65 % in the meantime. See *Doke/Moxon* (2000), p. 27; *Vinois* (2003), p. 17.
- viii. While beyond the scope of this paper, it is highly doubtful that this modal-split shift could have been accomplished without the massive state aid doled out by most European member-states to their (state-owned) railways to build and operate these mostly unprofitable links. For details see *The Economist* (2001): French Railways: Très grand void [online], May 31st, 2001. Available from: http://www.economist.com/PrinterFriendly.cfm?Story_ID=639720 [Accessed 31 August 2004] and European Regions Airlines Association (2001): Rail-Air Comparison Study, Chobham Woking.
- ix. See *Doke/Moxon* (2000), p. 27.
- x. See *González-Savignat* (2004): Competition in air transport: the case of the high speed train. *Journal of Transport Economics and Policy*. Vol. 38 (1), p. 103.
- xi. See *Doke/Moxon* (2000), p. 24.
- xii. See *Mandle et al.* (2003): Use of public transportation by airport passengers. Proceedings of the 79th Annual Meeting of the Transportation Research Board, Washington DC, January 9-13th, p. 5.
- xiii. See Air Transport Action Group (ATAG) (1998): Air Rail Links: Guide to Best Practice. Geneva, p. 105.