

ASSESSING THE ATTRACTIVITY AND ACCESSIBILITY OF THE ROMANIAN AIRPORTS

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ABSTRACT. *Assessing the attractivity and accessibility of the Romanian airports.* The research examines the changing dynamics of Romanian airports within the framework of European air transport deregulation and the subsequent “open skies” policy. A basic accessibility assessment method was applied, which involved weighting destinations according to their relative significance. The results highlight the dominance of certain airports and the limited competition for global hubs. The study concludes by emphasizing the need for detailed airport analysis to develop an attractiveness model specific to Eastern-Central Europe, incorporating economic, geographic, demographic, political, and infrastructure factors.

Keywords: *accessibility, weighting, ranking, competition, airport.*

Introduction

The completion of deregulation in Europe in 1993 and the adoption of the “open skies” policy prompted a reorganization of air transport networks. Following their accession to the European Union, Eastern countries transitioned from a capital city-centric structure to a decentralized polycentric model. The competition among regional airports, particularly in terms of accessibility, connectivity, and centrality, reshaped the hierarchy and created varied opportunities, significantly impacting regional development.

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Beyond their classical role as transit points, airports have become complex entities and play an increasing role in the regional and global transportation network, serving as hubs that connect people and businesses across the world, or as destinations for tourism and investment, impacting regional economic development. Airport attractiveness is a critical concept in the air transport industry and is related to factors that make a particular airport valuable to airlines, passengers, and businesses, both from the aviation industry and other air transport-sensitive activities. The elements of airport attractiveness have an important role in influencing decisions related to passenger choice in a multi-airport region (MAR), route planning, or partnerships among airlines. Thus, airport competitiveness relies upon this attractiveness derived from costs and time of ground accessibility, transit time and passenger experience in terminals, operational efficiency as concern delays or cancellations, and type of airline companies, but the most important element is connectivity with important regional and global airports.

With rising incomes of the emergent economies, such as Romania's, the increase in tourist traffic and the need to be linked to the main command centers of the world economy, lower-ranking cities, through the airports that serve them, have initiated new connections based on regional and global air transport. If a few decades ago, there was merely one international airport gateway in Romania, the desire to connect to the global economy, the appetite for tourist travel, and the need for ethnic traffic, determined an opening of Romanian airports to European destinations through direct connectivity, without intermediate layovers. This fact was possible after the liberalization of air transport and the adoption of the open-skies policy at the level of the European Union and through the development of point-to-point networks of low-cost airlines. Economic growth in certain regions attracted also traditional network companies, which enhanced their regional relevance and integrated corresponding airports into global air transport networks. In such conditions, air travel became affordable for more and more people and the air transport market has increased several times in quite a short period (5.6 million available seats in 2013 and 15.6 million in 2022).

The paper discusses the concept of air transport accessibility, defining it as the capacity of a location to be reached from or provide access to other locations (Reynolds and McLay, 2006). In this paper, we will make an assessment of the Romanian airport's attractiveness based on different techniques used in air transport literature, to develop, in subsequent research, a new indicator to quantify airport attractiveness specific to Eastern-Central Europe that may be applied to other regions with similar network characteristics and taken into consideration by decision-makers in regional planning.

Literature overview on airport attractivity

The academic interest in air transport analysis has attracted many specialists from different sectors such as management, policy, economy, geography, and sociology of air travel. In a systematic literature review on transportation in more than one thousand papers from the ISI Web of Science Database, Ginieis *et al* (2012), identified airports as the second theme indexed as “air transportation”. Within airports theme, attractivity, and competitiveness is one of the major subjects both for professionals and academics.

The literature encompasses several studies related to attractiveness, with most relying on mathematical modeling based on criteria that define attractiveness. Thus, Burghouwt & de Wit (2005) analyze connectivity and wave system structures in airline hubs, while Malighetti *et al.* (2008) explored the concept of indirect connectivity as self-help hubbing and developed an index of connectivity in their study. Focusing on the behavioral aspects of travelers, Hess & Polack (2005) and de Luca (2012) utilized logit models to analyze the impact of variables like access time and flight frequency on traveler choices. Teixeira and Derudder (2021) used the Huff model based on attractiveness and distance variables in MAR, while Morton & Mattioli (2023) developed in a similar region a spatial interaction model based on characteristics of the origin, attractivity of the airport services, and intervening opportunities. Reynolds and McLay (2006) used available seats and available seat miles for ranking the attractivity and connectivity of European airports, and accessibility was measured according to the weight of the destination.

Together, these studies form a mosaic of research in the air transport and transportation modeling domain, providing valuable insights into the multifaceted nature of attractivity and connectivity, traveler behavior, economic influences, destination ranking, and overall transport competitiveness. It is worth noting that other attractiveness indicators exist, such as infrastructure quality, operational efficiency, and environmental sustainability.

Assessing connectivity and accessibility

To assess the attractiveness of an airport, we focus on accessibility and connectivity, which are fundamental attributes of a transportation network. Connectivity is evaluated from the accessibility standpoint, specifically measuring direct connectivity, which represents the passenger traffic between pairs of routes in a point-to-point network. While indirect connectivity has been considered by some researchers (Burghouwt and Reddondi, 2013), we focus on

direct connectivity for this analysis. Airport accessibility is viewed as a measure of its ability to serve as a gateway to other destinations rather than its physical accessibility via ground transportation.

We evaluated the attractiveness of eight airports in Romania with available data provided by Eurostat (routes Data), through the lens of connections and the number of seats available (PAS-DEP, passenger available seats for departures) on regular flights to airports in the European Union. British airports were also considered because connections with those airports were established before Brexit and also, for comparison reasons, with the year 2013.

As in the study of Reynolds and McLay, we ranked the destination airports by two methods and measured accessibility by involving the number of seats available. Destination quality was obtained by ranking all airports in the network in relation to the most transited European airport from the network, and attractiveness to the most transited Romanian airport. A higher importance score indicates that the destination airport is more important and that it should be given more weight in the accessibility calculation.

The reference years are 2013 and 2022, which correspond to post-crisis periods, the first financial and the second, pandemic. Available seats for departures were taken into account, although some studies considered available seat kilometers, where longer flights determine a different hierarchical position of the airports in question. In our case, the flights are regional, with no regular air transport services to other continents (except for a few in the Middle East).

We thus used the weight-based available seats to rank the airports in the region, 53 in number, to which there were regular flights from 8 Romanian airports in 2022 (46 and 7 respectively, in 2013). Ranking airports according to attractiveness and accessibility would require a detailed analysis of each airport, which depends on the specific data and research objectives. However, this analysis should take into account the criteria mentioned above to rank airports according to their importance in the respective region or country.

Results

To evaluate the attractiveness of airports, we examined metrics derived from available seat numbers, the number of destinations served, and airport rankings. London Luton Airport (LTN) ranked highest in terms of overall destinations in 2022, while Bucharest Henri Coandă International Airport (OTP) topped the list for Romanian-origin airports. Among European destinations, only three - Luton, Charleroi (CRL), and Bologna (BLQ) - have direct connections to all Romanian airports considered. Bergamo (BGY) follows with seven connections, and Dortmund (DTM), Dublin (DUB), and Barajas (MAD) each have

six connections. In 2013, München Franz Josef Strauß Airport (MUC) was the most prominent destination, followed by Vienna International Airport (VIE), highlighting the significance of the Lufthansa Group. Bucharest (OTP) was the dominant domestic airport, and no other regional airport offered connections to all European destinations.

Except for München (MUC) and Frankfurt International (FRA), there is no competition for global hubs, like London Heathrow (LHR) and Gatwick (LGW), Paris Charles de Gaulle (CDG), Amsterdam Schiphol (AMS), or Copenhagen Kastrup (CPH), revealing the dominance of low-cost carriers.

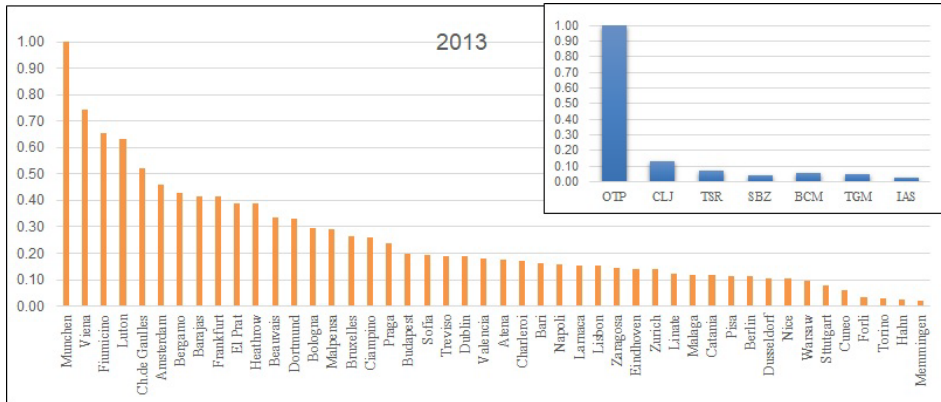


Fig. 1. Weights of the European destinations and accessibility index for Romanian airports in 2013.

Source: the authors

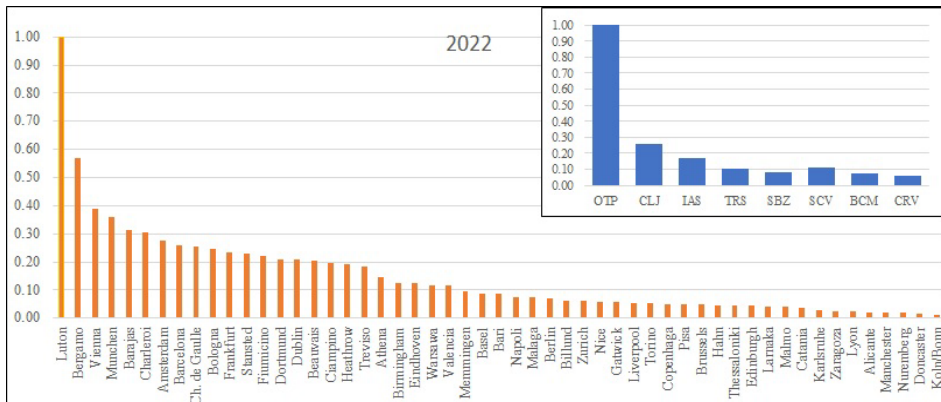


Fig. 2. Weights of the European destinations and accessibility index for Romanian airports in 2022.

Source: the authors

Bucharest's airport (OTP) stands out as the most accessible and attractive airport in Romania, surpassing all regional airports in this regard. Other airports only managed to achieve similar performance in the absence of direct routes from OTP. For instance, Cluj-Napoca International Airport (CLJ) showed minor competition with OTP in 2013, but increased in 2022. Craiova airport (CRV), a new entrant, is the lowest ranked airport.

Genuine competition among airports can only be observed when the accessibility index exceeds 0.5, which is rare and limited to specific destinations. For example, CLJ's accessibility index surpassed 0.5 for destinations like Dublin, Beauvais (BVA), Eindhoven (EIN), Valencia (VLA), Basel (BSL), Billund (BLL), and Larnaca (LCA). Similarly, Iași International Airport (IAS) surpassed 0.5 for Luton, and Suceava International Airport (SCV) surpassed 0.5 for Bergamo.

When considering a more stringent accessibility index of 0.8, combined with a maximum access time of two hours, true competition emerges among regional airports. This scenario is evident in cases like Cluj-Napoca-Sibiu (SBZ)-Timișoara (TSR) and Iași (IAS)-Bacău (BCM).

Conclusions

As incomes have increased in many communities, disposable income for travel has grown significantly over the past decade. This economic improvement, along with the temporary migration of Romanians abroad and the recent influx of foreign workers, has directly or indirectly contributed to increased connectivity and air traffic between Romanian airports and those in the European Union.

What is remarkable, is the incipient decentralization of air traffic, with the growing importance of some regional players like Cluj-Napoca (CLJ), Iași (IAS), or Suceava (SCV) and the competition among airports with overlapping catchment areas.

Ranking airports according to attractiveness and accessibility would require a detailed analysis of each case. Regarding the development of an attractiveness model for airports in Eastern Europe, it should take into account specific economic, geographic, demographic, political, and infrastructure data and particularities of the region. Mathematical modeling of an airport's attractiveness is a technique that can be used to better understand the factors that contribute to an airport's attractiveness, even if there are exogenous variables that can limit the models used.

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