

Air Transport and Connectivity: Evidences on the Emergence of Tourist Nucleuses in the World Urban System

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1. INTRODUCTION

The aim of this study was to examine the relationship between air transport and tourism based on the premise of a necessary inter-relationship that has spurred development in both sectors. In the late 1960s, mass tourism witnessed marked expansion because the development of jet aircraft made it possible to connect supply (destinations offering sun, sea and sand) and demand (people in developed countries); previously, access to such destinations had been limited by physical and social factors such as travel time and economic constraints (Córdoba, J. *et al.*, 2007). Some destinations are highly dependent on air transport: in some years, more than 80% of total tourists use air transport to reach destinations such as Japan, Taiwan, Australia, New Zealand, the Philippines, South Korea, the Dominican Republic, Cyprus, India, Thailand and Greece (Keller, P., 2002). Similarly, some airlines are highly dependent on tourism for their survival, because demand has determined the sector's structure, logistics and specialisation in this market (Bieger, T. *et al.*, 2006). Such is the case of charter airlines, specialist segments within major airline fleets and the emergence of low-cost airlines.

The significant functional and territorial specialisation that confers primacy to one destination over another is based on the economic and social possibilities offered by the existence of infrastructures and an air transport network connecting supply and demand (Gago, C., 1998). Some studies have shown that transport infrastructures act as a pull and competitiveness factor in tourism (Khadaroo, J. *et al.*, 2008). This is a reflection of the socioeconomic system in which these two deeply interdependent sectors are embedded.

Based on this premise, the study hypothesis was that in view of the inter-relationship and interdependence of the two sectors, any change in the location or competitiveness of destinations would necessarily be reflected in the structure and development of the air transport network, and this latter would thus serve as an indicator of territorial structure and the emergence and consolidation of cities as tourist destinations. In addition, we suggest that the influence of tourism on the organisation of the urban system, both globally (the global urban archipelago) and at other scales, has to date been underestimated.



2. METHOD

In order to analyse change and continuity in tourist cities worldwide, we selected the top 100 city destinations in the world (highest number of international tourists in 2006-2016; 134 in total) based on the *Top 100 City Destination Ranking* (Euromonitor International). Since some cities appeared or disappeared from the lists according to their development, information was also obtained from alternative sources, in particular from national and local statistics departments.

To assess each destination's international tourism appeal and the role played by air transport, we compared the volume of international tourists with international air traffic, considering both the frequency and geographical diversity of connections. For the latter, we calculated a geographical specialisation coefficient for flight connections (GSCF) using the Sargent-Florence formula. To this end, we considered the degree of specialisation of direct flight connections outside the continental region in which each city was located (connections further away from the reference area were given a positive weighting of 50% more than the other connections). Frequency (flights) and connection data were obtained from databases provided by the company OAG Worldwide. We also calculated mean annual growth rates for international tourists and flight frequencies.

Once the data had been classified (international tourists, flight frequencies and geographical specialisation of connections), we conducted statistical analyses to assess their inter-relationship. This included measuring the linear correlation between groups of cities with similar characteristics or geographical locations (Table 2).

3. RESULTS AND DISCUSSION

The main study results are given in the accompanying tables and graphs. The first aspect to note is the strong emergence of Asian cities in the global tourism market (Table 1), both in China, a country that has consolidated its position as a global tourism power, and in other countries offering sun, sea and sand or perceived as exotic (Southeast Asia: Thailand, Vietnam, Cambodia and Indonesia). There is an appreciable or significant correlation between the total of tourists and in flight frequencies in this region ($R=0.659$). The tourists-GSCF and flights-GSCF correlations, well above the global mean, are indicative of the growing international tourism appeal of these cities (Table 2). However, it should be borne in mind that some of the main destinations are cities that receive a large influx of visitors due to their border location, thus functioning as city states many of whose visitors come from neighbouring countries: Hong Kong, Macau and Singapore. The graphs and an analysis of residuals (regression analysis) help elucidate the causal relationships.

Conversely, despite the strong growth in tourism witnessed in European cities, these have lost ground, relatively speaking, on the world stage. Sun, sea and sand destinations and cultural cities alike present little dependence on air transport to attract tourists, relative to overland access to many of the destinations (Table 2). Nevertheless, connections to Mediterranean destinations present significant geographic diversity, which undoubtedly confers competitiveness vis-à-vis their Asian and Caribbean competitors. In addition, global cities are the ones that present the highest correlation between flights and tourists, well above all the others in the world. This is explained by Europe's continuing centrality with respect to the air transport network, besides its strong tourist appeal.



Cities in the Middle East have also witnessed significant growth in their tourist appeal, well above the importance of the aviation sector, despite hosting important hubs constructed in the past two decades. These destinations present an exceptionally global dimension, an aspect that is evidenced by the almost perfect correlation (0.99) between volume of tourists and diversity of flight destinations (GSCF).

Other more general aspects revealed by the analysis include: (i) the strong inter-relationship between volume of tourists in cultural capitals and flight frequencies. The same is true in the case of pilgrimage destinations; (ii) the limited importance of international air transport in ensuring the competitiveness of North American tourist destinations, relative to the influence of the domestic market; (iii) the strong dependence of sun, sea and sand destinations on international air transport to ensure their competitiveness, with the exception of the Mediterranean. This latter case is influenced by its proximity to markets, the role of domestic tourism and the new role that cruises are playing; (iv) the poor correlation between airport hub location and tourist market demands ($R=0.338$ tourists/flights). Thus, many tourists who use these airports do not stay in the cities in which they are located; furthermore, the geographic diversity of their connections reflects the demands of aviation logistics.

The scatterplots show the wide diversity of tourist city types and functions in the international arena, as well as other functions of the aviation sector: hence the poor correlation between volume of tourists/volume of flights ($R=0.408$). An initial interpretation suggests that when the number of tourists is high but there is a poor correlation between flights/tourists (Figure 1), this indicates that the destination can be accessed by other means of transport, or is close to a large airport hub, as is the case of destinations in Thailand with respect to Bangkok. When flight frequencies are high but there is a low correlation with volume of tourists, this could indicate that the cities have specialised in other productive sectors that also require air transport, as in the case of the major global cities.

4. CONCLUSIONS

An analysis of the relationship between volume of international tourists in cities around the world and the air transport network has revealed a high degree of interdependence between these two variables. Air transport plays an important role in ensuring a destination's accessibility and centrality, and as a result, some destinations are dependent on air transport to develop their tourism sector. This study represents an initial descriptive exploration of the relative importance and development of major tourist destinations between 2006 and 2016, and has revealed the strong emergence recently of Asia-Pacific and the Middle East. At the same time, uninterrupted growth in the volume of international tourists evidences the persistence of traditional tourist destinations primarily located in Europe.

The distinction made in this study between type of tourist destination according to function (i.e. sun, sea and sand, global cities, cultural heritage destinations) has proved very useful to evaluate the role that they play in international tourism. This functional diversity is also useful for assessing recent changes in the urban system at global level. For example, some destination cities have erupted onto the scene and now play a prominent role. Growth in the number of tourists is evidently accompanied by adjustments in a country's urban systems and in the sociodemographic and economic dynamics of the regions where this occurs. These aspects should not be underestimated from a geographical point of view, and merit detailed studies to gain a fuller understanding.

