

**TITLE:** ANALYSIS OF HUB&SPOKE'S OPERATIONS IN THE AIR TRANSPORTATION.  
APPLICATION TO THE AIRPORT OF BARCELONA.

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ABSTRACT:

The air transportation has had a giddy evolution along their short history, the airships year to year have gone adapting new technologies to do that the flights had more capacity, they went quicker, they had greater autonomy and above all were increasingly sure. During the decade of the fifty, sixty and part of the seventy, the annual rate of increment of volume of passengers was situated in percentages that oscillated among the 10% and the 15%. In this sense and contemplating the air transportation since a perspective of greater reach, the air transportation presents a constant path of growth that obeys essentially to the phenomenon of the globalisation.

Boeing and Airbus have carried out studies of prognosis of passengers that they verify an increase of the number of passenger.km of the 3200 million present to near 8000 million for the year 2020. To this data we should add the parallel development of the infrastructures of the airports and its adaptation or restructuring to face a greater number of users. The present airports count on better conditions of accessibility toward and since the outside, compared with other centers of the city, and should face a double competence: The intra metropolitan and the one that is established with other airports. With the liberalization of the domestic market of US and the interior market of EU began a process of growth and development in all the environments of the air transportation.

The main consequence of the liberalization is the organization of routes continuing plans of hub&spoke. With the years have developed different ways to organize hubs airports (simple hubs, directionals hubs, multiple windows, regional hubs, ..) that have permitted a better management of the great volume of passengers. Nowadays, it seems that the airports hub have been discovered in Europe and above all in Spain, but the reality is that it does about 20 years ago that this concept is carried applying in American airports.

The main objective of every hub is to be a platform of connections, organizing its flights according to windows of arrivals and departures of airplanes, so that enlarges the connectivity among the different destinies. To optimise the times of connection the buildings of passengers of the airports have gone adopting new technologies and very diverse forms as lineal terminals, with several fingers, satellite, unit terminal, etc. ...Some of them totally unfeasible to optimise the times of connection MCT and other more or less wise.

We have to carry out a change of mentality, because of many of the cabinets of architecture or Engineering, that are dedicated to the passengers buildings design in airports, they have committed large barbarities that there are side a great deal of money, because of many of these cabinets do not have in staff to experienced people in the processes that are given in an airport.

In this thesis a grain of sand is contributed presenting the bases to be able to classify hub airports according to some parameters of quality related to the percentages of passengers in connection. The model assigns a "qualification" to the airport depending on the characteristics in times of connection, that is to say, the level of quality that is offering the airport respect the major level of quality that is capable of offering. With this objective the quality of service is related with the average distance walked by the passengers for different percentages of connection at hub airports.

The results have been obtained from applying the impedance matrix model and of Flow (Neufville, 2003) to the main finger of the N.T.A south of Barcelona's Airport. This model is applicable to other airports because of the conditions of contour and the respected hypothesis are of general type.

Finally, the new tendencies of the airports are commented with respect to their geometry and organization and the apparition of a new concept utilized by some authors as is, the elastic terminal, in contradiction to the present airports because of ultimately are being built monumental airports but those continue incorporating traditional processes, that multiply the systems, times and spaces.