



Project Title: The Effects of Global Aviation Network Data Analytic Approach on Strategic Network Development and Traffic Forecasting

研究項目: 研究全球航空網絡數據分析方法對戰略網絡發展和流量預測的影響

Investigator: Dr WONG Collin Wai-hung (PI), Dr CHEUNG Tommy Kin Yin (Co-I), Prof ZHANG Anming (Co-I)

Funding Scheme: Research Grants Council – Faculty Development Scheme (FDS)

Project Period: From January 2021 to December 2022

Project Reference No.: UGC/FDS14/B02/20

Abstract

A change in routes at an airport has a huge impact on airlines' revenue and the economy of the city where the airport is located. Airlines' route networks are crucial for obtaining competitive advantages in the market. Planning a successful route is a complicated decision-making process that involves considerations beyond the origin and destination. Airlines seldom consider how their addition of new routes or revision of existing routes (or the addition or revision of routes by competitors) affects the global aviation network which in turn impacts demand. By providing a new route, an airline not only impacts competing airlines but also affects transfer passengers' choices and demand for existing routes connecting the origin or destination. However, past studies of passenger demand forecasting at the route level have failed to consider network changes. Also, there is no study concretely identifies the relationships between airports that did not directly connect when the global network changes.

Today, the world is fully connected and has entered the big data era. The aviation industry should therefore consider using new methods of strategic route development and revenue management. With the support of increasingly powerful computers, managers can make better use of global aviation data and apply a complex analytic approach to make timely decisions. We propose a new data analytic approach using millions of global route data since 2006 to identify new routes with the potential for long-lasting service, and to assess connection quality from the aviation network perspective. Our approach will include a comprehensive methodology for analyzing the aviation network, partitioning the global network into core and auxiliary substructures to understand its dynamics, thereby evaluating potential route quality, deciding which routes warrant selection, and forecasting long- and short-term traffic volumes for the selected routes. Metrics will be identified to evaluate route selection, covering growth, volume, and connectivity potential. Assessing connectivity potential permits the evaluation of the importance of a potential destination airport on a new route by considering the changes in competitive position that other airports connected to the same destination can expect when that new route is added to the network. Our approach will exploit the geographical relationships between airports and draw on network route supply data for a long period of time to make assessment decisions about new destinations. A list of promising new destinations will be created that can enhance the origin airport's connectivity potential and improve the competitive advantage of airlines.