

Understand spatial and temporal characteristics of HNWI's aeromobility using Jet Card data

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Project Background

The global business aviation sector has been facing continuously boost with its fleet growing by nearly 80% between 2001 and 2018. In response, Air Partner has introduced the JetCard as a private jet membership programme in the form of stored-value card. While reports do provide insights concerning business aviation, such reports are somewhere either general with only providing a general overview or narrow as to fulfil particular tasks appointed by clients. Meanwhile, the nature of HNWI privacy further increases the difficulty to obtain accurate mobility data. Therefore, by analysing JetCard data company can have a better understanding of customers to develop robust marketing strategies, as well as to explore the aeromobility of HNWIs spatially and temporally which linking to wider social, economic and environmental aspects.

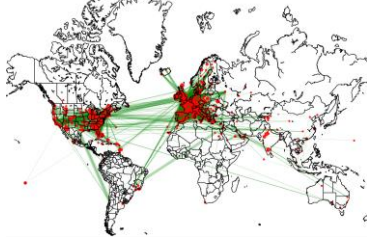


Figure 1. Flight routes over the study period

Data and Methods

Air Partner provided Jet Card transactional data from January 2006 to July 2019, including time of the flight, route code and travel costs. The route code showed all the stops which were included in a booking. There were three measurements in describing the cost generated from each booking, namely the hours, rate per hour and total price. We employed the concept of RFM analysis and undertook K-Means clustering to segment customers with different purchasing behaviours. The variables included time interval between the last booking and the current time as variable of recency (R), total amount of bookings as variable of frequency (F) and the average spending per booking as monetary variable (M). Membership length as variable of length (L) is also included to explore customers' differences in the time of interaction.

Key Findings

Customers were predominantly commuted between North America and Europe. Routes with relatively large number of occurrence also appeared in South America.

K-Means algorithm effectively segmented customers 515 customers into four groups, with

cluster 0 has the least customers of 21 and cluster 2 "the relatively new incomers" has the most customers of 263. Cluster 0, 'High profitability loyal bookers' stood out among other clusters with its average membership length of 103.16 months, median booking counts around 89 times and a relatively small median time interval between the last booking and now around 2.23 months. Cluster 1 'Inactive and defected members', contained the most loyal customers with the median length of 144.25, however these customers were less active with the average recency of 9 years. When considering the temporal patterns, cluster 0 had continuous bookings over the study period, with cluster 0 maintained approximately the same percentage of bookings for the past four years. Noticeable differences can be detected between cluster 1 and 2 for these two patterns were almost symmetrical to each other if taken year 2012/13 as the symmetry axis.



Figure 2. Top: Percentage of bookings by year; bottom: percentage of bookings by month

The percentage of bookings from cluster 1 had been gradually decreasing from 34% since 2007 and finally reached 0% in 2015, while cluster 2 had considerably increasing bookings since 2012 with 28.8% of bookings were made in 2018. All four clusters expressed similarities in terms of booking patterns by month which the majority of bookings are taken place between June and August. One possible assumption was that the main purpose of customers' travel was for summer vacation.

Value of the Research

This research provides a method for identifying customers with different purchasing characteristics, which assisted the company to understand the influential factors in determining customers from different groups and ultimately develop better-targeted marketing strategies. Meanwhile, the visualisation of flight route for both all customers and for each cluster allowed the company to identify the prevalent routes, origin and destination so that to implement successful and profitable flight policies in the future.