



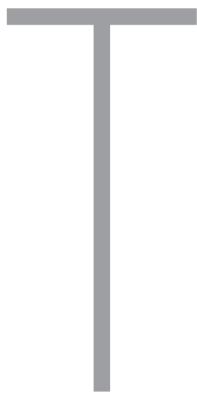
TRANSCENDING

A More Strategic Method
For Airline Market
Segmentation

GEOGRAPHY

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Though most airline planning and scheduling managers are aware of the importance of market/O&D segmentation and the crucial role it plays in generating profits, most often they tend to rely on intuition or traditional segmentation methods that are based only on geography. However, the inherent simplicity that lies within such segments/groups no longer holds true in an ever-dynamic and competitive airline industry. Without proper planning, marketing and operations, maintaining profits in such an environment becomes a sizable challenge for airlines.



Today, airline planning and scheduling teams use technology that is strictly geography based, which is too restrictive for a hyper-competitive airline landscape. This impedes airlines' ability to customize or modify the schedule and, therefore, prevents them from realizing their full market potential due to inefficient grouping.

However, an alternate methodology exists to group markets by a number of additional market characteristics such as airports, itineraries and schedules. The new methodology was compared against the traditional geography-based grouping method using Sabre AirVision Profit Manager forecast on a medium-sized airline network.

Technical Details

To be specific, a market group is a set of O&D pairs that originates in one region, such as North America, and terminates in another region, such as the Middle East.

For the comparison exercise, Profit Manager used O&D principles to capture true network effects in building itineraries and forecasting passenger demand, spill, traffic and revenue. Calibrating the inputs into Profit Manager represented a critical step in effectively utilizing the power of the system.

Calibration is a seasonal and iterative process to define and refine connection, market share and other parameters for Profit Manager. The impact of calibrated parameters varies with the network size and structures. Generally, all of these input parameters are calibrated at an entity level (market group).

However, the current calibration process requires an additional effort during the final stages when airline analysts work toward generating individual market-specific parameters for markets that have different attributes from those of the entity group. Often times, the reason for such a difference is because the markets are clustered into a heterogeneous market group, which was, again, based on geography.

Sabre recently conducted an extensive market-segmentation research exercise to demonstrate the higher efficiency of market grouping based on non-geographical market characteristics as compared to traditional market-grouping methods.

In addition to significantly reducing errors, the new method stands apart because it saves time for airline analysts, who, using the new method, are not required to add any specific market-input parameters into the system even after adding market-group level inputs.

Attribute Selection

There are various factors that differentiate a market's characteristics from the rest. These factors can be broadly categorized into attributes pertaining to schedules, arrival and departure airports, service types, market players, market distance and market fares.

The key is to choose the most important attributes while ensuring there is no redundancy or interdependency among them, which helps avoid challenges while performing a clustering analysis. It is also important to select attributes that showcase ease of selection and interpretation for analysts. Therefore, several attributes were chosen for the segmentation work, including:

- Market circuitry,
- Market elapse-time ratio,
- Number of distinct itineraries/services in the market,
- Total market passengers,
- Market connect times,
- Passenger share across various service types offered,
- Geography (continent),
- Passenger share across various aircraft types,
- Departure time/quarter preference,
- Low-cost-carrier presence in the market,
- Arrival time/quarter preference.

Market Information Data Tapes (MIDT) itineraries condensed into market-level information were used to capture the designated attributes.

Feature-Based Clustering Details

Cluster Analysis

Cluster analysis, or clustering, groups a set of objects so items in the same group (called a cluster) are more similar to each other than to those in other groups (clusters). Clustering is used across various industries and applications such as computational biology, bio informatics, medical imaging, social-network analysis, image segmentation and market research.

For example, market researchers use cluster analysis to partition the general population of consumers into market segments, as well as to better understand the relationships between different groups of current and potential customers. Moreover, it is used in market segmentation, product positioning, new product development and selecting test markets.



Similarly, in the airline industry, clustering is applied in customer segmentation where airlines would want to know which segment its customers are in so they can tailor their marketing plans accordingly. In this instance, clustering is applied to segment the markets based on certain characteristics in addition to geography.

Algorithm

The dataset considered for this research consists of both categorical and continuous variables. A suitable algorithm was selected that would work with both continuous and categorical variables.

There are specific steps an airline analyst must take when clustering:

1. Find the optimal number of clusters from the training dataset. A training dataset was used to identify an optimal number of clusters through a specific clustering algorithm, which was further used to help classify the appropriate global market group for each cluster.
2. Apply clustering algorithm for a specific number of clusters obtained from step 1.
3. Create a classification object using a specific dataset along with clusters obtained from step 2.
4. Use the classification object obtained in step 3 to predict the clusters for the rest of the data.

Inside The Clusters

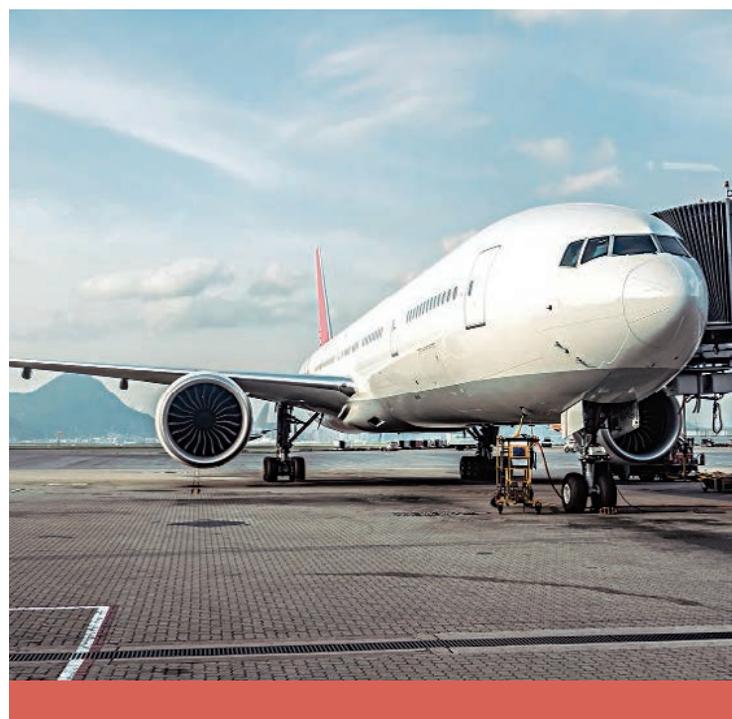
To better understand the differences among market groupings, three markets were used as examples: Berlin, Germany, and Stockholm, Sweden; Berlin and Gothenburg, Sweden; and Berlin and Kittilä, Finland.

Using the standard geography-based methodology, all markets are grouped in the same entity/market group. However, when using the new methodology, these markets fall under different market groups.

For example, attributes of the Berlin-Stockholm market include a high passenger volume, nonstop service and high distinct itineraries, whereas the Berlin-Kittilä market shows low passenger capacity, with low distinct itineraries and mostly single online service. Additionally, the Berlin-Gothenburg market is known for its medium range of passengers and distinct itineraries when compared to the other two markets.

Another example includes Miami, Florida, and Buenos Aires, Argentina; London, England, and Delhi, India; and Doha, Qatar, and Dubai, United Arab Emirates. Using the standard geography-based method, these markets are grouped into different entities/market groups because they belong to different geographies completely.

However, using the new method, these markets fall under a single market group due to similar market characteristics such as high passenger volumes, similar departure-time preferences and dominant wide-body aircraft offerings.



The FVA results of the new market groups were compared against geography-based FVA results and concluded that:

- The itinerary-match percentage (the percentage of historical passengers covered by the simulated itineraries) and overbuild (the extra itineraries that are created for every matching itinerary in history) were either in par with or superior to the entity-based methodology. This validates the new method's ability to deliver high-performance schedule-profitability forecasting within the tool with better connection building while maintaining the accuracy standards of the old method.
- Market-share errors at a system level is slightly higher, primarily due to a few outlier markets contributing to it. However, the rest of the markets were observed to have demonstrated much less errors than the old method.

In addition to significantly reducing errors, the new method stands apart because it saves time for airline analysts, who, using the new method, are not required to add any specific market-input parameters into the system even after adding market-group level inputs. This is possible because now analysts no longer have heterogeneous market groups. Moreover, inclusion of additional attributes can better differentiate the markets and produce superior results. ASCEND



▲ THERE ARE A NUMBER OF FACTORS THAT DISTINGUISH A SPECIFIC MARKET'S CHARACTERISTICS FROM THE REST. THESE FACTORS CAN BE CATEGORIZED INTO ATTRIBUTES PERTAINING TO SCHEDULES, ARRIVAL AND DEPARTURE AIRPORTS, SERVICE TYPES, MARKET PLAYERS, MARKET DISTANCE AND MARKET FARES, RESULTING IN MORE PRECISE MARKET GROUPINGS AND SEGMENTATION.

New Versus Old Groups

To test the performance of the new market groups, a European carrier with nearly 85,000 markets was selected. The connection and market-share parameters were regenerated for the new market groups. Profit Manager was used to generate forecasts for the airline schedule using input parameters that were calibrated at the level of new market groups.

The forecasts were evaluated using the standard "forecast-versus-actuals" (FVA) methodology, where the actuals used are seasonal average numbers selected from the airline's actuals data. A similar exercise was also conducted to generate forecasts from Profit Manager for the same schedule using input parameters calibrated at a geography-based market-group level. These forecasts were also evaluated against the airline's actuals data.

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